



Environmental Assessment for North Fork Saline Project

Responsible Agency:

US Forest Service, Ouachita National Forest
Jessieville-Winona-Fourche Ranger District

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Chapter 1

Purpose of and Need for the Proposed Action

Proposed Action

The Jessierville-Winona-Fourche (JWF) Ranger District proposes to implement the following management activities (acreages are approximate):

- Seedtree regeneration harvest* – 459 acres
- Shelterwood harvest* - 123 acres
- Commercial thinning – 2,347 acres
- Site preparation* – 582 acres
- Site preparation of storm damaged area** - 742 acres
- Clearcut genetically modified loblolly pines, site prep, replant native species**—407 acres
- Timber Stand improvement by midstory reduction* – 1,963 acres
- Stand improvement- release* – 1,129 acres
- Prescribed burning – 14,700 acres
- Fire line construction – 4 miles
- Fire line reconstruction/maintenance – 2.5 miles
- Wildlife Stand Improvement – 1,122 acres
- Glade Restoration – 34 acres
- New wildlife pond – 1 pond
- Wildlife Pond rehabilitation – 45 ponds
- New wildlife openings – 8 openings
- Wildlife opening decommission – 4 openings
- Nest box installation – 2 units
- Road reconstruction/maintenance – 26 miles (36 miles at time of scoping)
- Temporary road construction – 8 miles
- Road decommission – 4.4 miles (roads Y36A, Y36B, Y36L (eastern end between 809 and Y36J only), and 809 (western end only))
- Recreational Trailhead Parking Construction – less than 0.5 acre

*Includes use of herbicides, prescribed burning, and manual hand tools such as chainsaws, also mechanically scarify site prep areas as needed

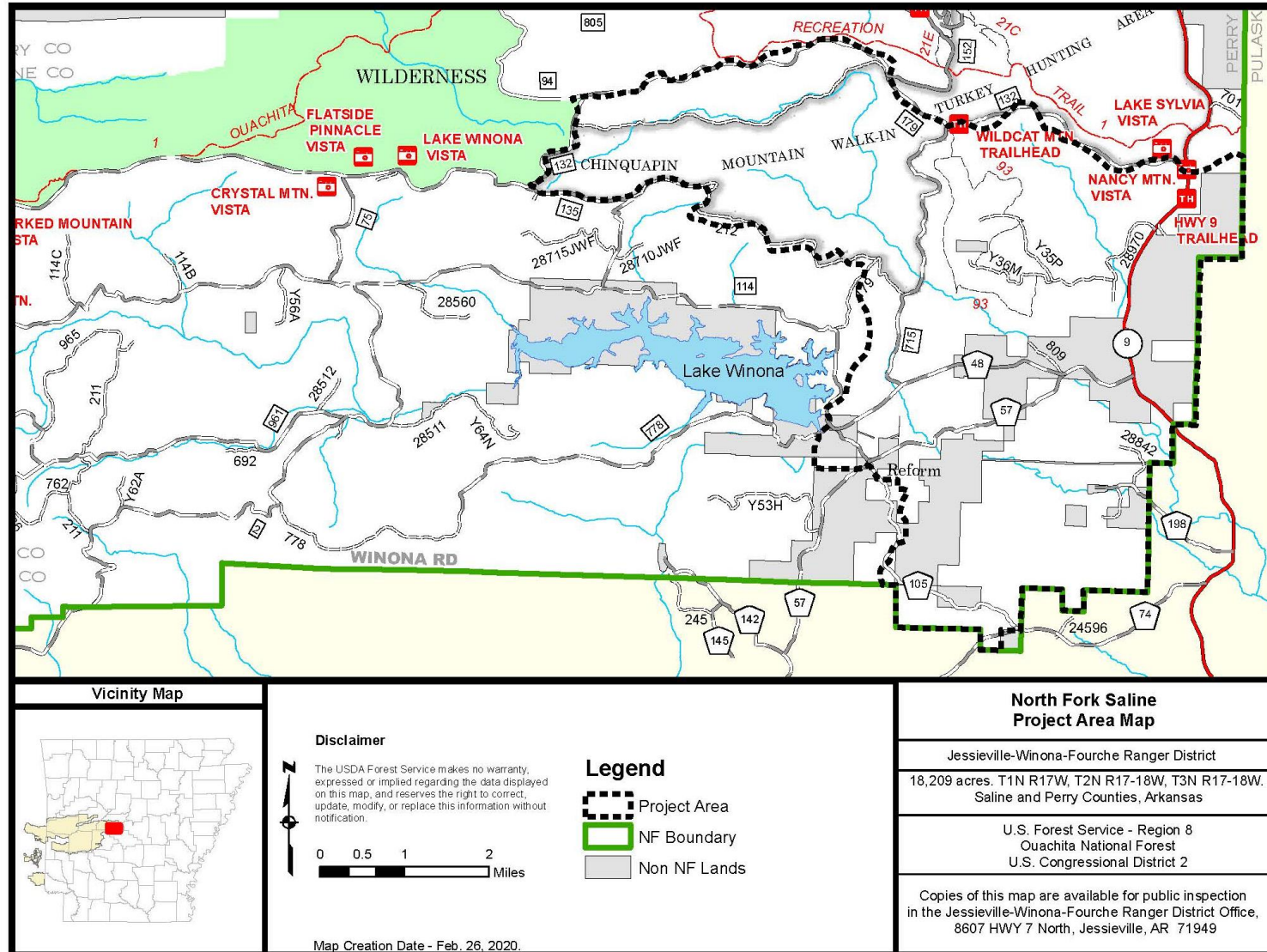
**Includes use of herbicides, prescribed burning, manual hand tools such as chainsaws, and mechanical site prep such as bulldozers (ripping)

Maps associated with this proposed action are available on-line at:

<http://www.fs.usda.gov/project/?project=55319>.

The project area is located approximately 12 miles south of Perryville, Arkansas in Saline and Perry Counties in T1N R 17W, T2N R17-18W, and T3N, R17-18W. Of the 18,209 acre project area, 14,700 acres are located on National Forest system lands. The proposed action would occur in Management Areas (MA) 6 (Rare Upland Communities), 9 (Water and Riparian Communities), 14 (Ouachita Mountains – Habitat Diversity), 17 (Semi-Primitive Areas), and 20 (Wild and Scenic Corridors).

North Fork Saline Vicinity Map (Figure 1)



Purpose of and Need for the Action

Overall guidance for the proposed project is found in the 2005 Revised Land and Resource Management Plan (Revised Forest Plan) for the Ouachita National Forest (ONF). The primary goal of the Revised Forest Plan is to promote diverse, healthy, productive, and sustainable ecosystems. The purpose of this action is to restore the health and vigor of the project area by providing for a diversity of plant and animal communities, early seral habitat in a well-distributed grass/forb or shrub/seedling stage, reduction in fuel accumulation, and production of a sustainable yield of wood products.

Need for the Action

- Current conditions in the project area do not meet the desired conditions for the forest MAs and the ecological systems that occur within.
- Past fire suppression activities have removed the natural role of fire from the landscape. This absence of fire has resulted in excessive fuel accumulations, increasing the risk of damage to resources in the event of wildfire.
- The absence of fire has resulted in reduced open understories necessary for the growth of many native plant communities, wildlife foods, and the natural regeneration of pine and oak.
- Pine stands contain damaged, poorly formed and diseased trees. The trees are overcrowded or densely stocked, which reduces growth and crown development. These conditions result in stress and reduced vigor and health, and increases susceptibility to insects and disease.
- Some stands contain genetically modified loblolly pine trees. These trees are more susceptible to disease and insects than native species.
- There is limited access to those stands in need of silvicultural treatment, resulting in the need for temporary road construction. Some existing roads are not useable by log trucks for hauling, creating the need for road re-construction.
- There is a lack of high quality forage and a lack of nesting habitat for species requiring early successional habitat within the project area.
- There is a lack of suitable natural cavities for nesting within the project area.
- There is need for standing water to be available throughout the project area year-round for consumption by wildlife and as reproductive sites for native amphibian species.
- There is need for restoration of glade areas.
- There are stands of storm damaged trees in need of silvicultural treatment.

Existing Conditions Contrasted to the Desired Conditions (Table 1.1)

Desired Conditions	Existing Conditions	Site Specific Needs	Proposed Management Activities
Improve forest health by maintaining conditions that would reduce insect and disease caused losses (Revised Forest Plan, pp. 58-59).	Trees in many pine stands are crowded or densely stocked; many Forest stands are older than 50 years. This results in stress, reduced vigor and health, increasing susceptibility to insects and disease.	Need to restore healthy conditions by limiting overstory, removing unhealthy trees, and reducing stocking.	Commercial Thinning of shortleaf pine. 2,349 acres.
No more than 14% in MA 14 of the suitable land in the 0-10 year age class. (Revised Forest Plan, pp. 78).	Currently, there are only 494 acres of 0-10 year age class in MA14 within the project area.	Need to increase early seral stage habitat.	Clear cut 405 acres. Shelterwood 123 acres. Seed Tree 459 acres.
Have suitable seedbeds in regeneration stands.	Conditions do not exist for successful natural regeneration.	Need to create a suitable seedbed for seed fall after the regeneration harvests.	Prescribed Burning Site Prep by Hand tools Site Prep by Mechanical Scarification with hand planting of shortleaf pine if needed. Herbicides optional. 1,324 acres.
Have food available for wildlife (Revised Forest Plan pp. 78).	New browse is limited within the project area.	Need to provide new growth for wildlife throughout the project area.	Seed tree, Prescribed Burning. 14,700 acres.
Reduce wildfire hazards (Revised Forest Plan pp. 68).	A lack of prescribed burning, natural fuel buildup, have increased wildfire hazards.	Need to reduce fuel loading throughout the project area.	Prescribed Burning. 14,700 acres.
Increase growth rate and quality of desired trees (Revised Forest Plan pp. 83).	Competition among species is reducing growth rate.	Need to decrease competition for nutrients and water among species.	Hand Tool Release w/herbicide option. 1,130 acres.
Provide at least one permanent water source per 160 acres for wildlife objectives (Revised Forest Plan, pp. 79).	Existing water sources are sufficient for most of the project area.	Add new ponds where needed. Rehabilitate existing ponds.	Create 1 new pond. Maintenance of 45 existing ponds.
Open stand conditions to allow improved development of grasses and forbs on the forest floor (Revised Forest Plan, pp. 78).	Stand conditions are in many areas heavily stocked, reducing sunlight to the forest floor which inhibits development of grasses and forbs.	Reduce midstory on areas slated for thinning and reestablish fire.	Prescribed burning, silviculture, and wildlife stand improvement using manual hand tools. Herbicide optional. 4,216 acres

Existing Conditions Contrasted to the Desired Conditions (Table 1.1)

Desired Conditions	Existing Conditions	Site Specific Needs	Proposed Management Activities
Provide bird nesting structures where suitable natural cavities do not occur and when needed. (RLRMP, WF009, p.79)	There is a lack of suitable natural nesting cavities for wildlife within the project area.	Provide nesting structures throughout the project area.	Install additional nesting structures. Up to 2 structures.
Contribute to the economic base of local communities by providing a sustained yield of wood products at a level consistent with sound economic principles and appropriate multiple use objectives. (RLRMP p. 68)	Pine plantations contain damaged and poorly formed trees. These plantations are also overcrowded and densely stocked which results in reduced growth and crown development. These conditions result in poor quality wood products.	Reduce basal area levels in pine plantations and other overstocked stands.	Commercial thinning. 2,349 acres.
Close intermittent service roads after construction until access is needed. Do not locate roads and trails within or immediately adjacent to Streamside management Areas. (RLRMP P. 91)	Some routes were intended to be closed but were not. Some routes are located too close to streams.	Close roads as appropriate.	Close roads as appropriate.

Scope of This Environmental Analysis

Relevant Planning Documents

The following documents directly influence the scope of this environmental analysis.

- Revised Land and Resource Management Plan (RLRMP or Revised Forest Plan) for the Ouachita National Forest (USDA Forest Service, 2005a)
- Final Environmental Impact Statement (FEIS), Revised Land and Resource Management Plan, Ouachita National Forest (USDA Forest Service, 2005b)

The Revised Forest Plan guides all natural resource management activities for the Ouachita National Forest. The forest management direction, communicated in terms of Desired Conditions (pp. 6-26); Strategies (pp. 27-72); and Design Criteria (pp. 73-123) that apply to the forest lands identified in this proposal are incorporated by reference.

Reference for Revised Forest Plan Standards by Management Area (Table 1.2)

Management Area Number	Management Area Description	Project Area National Forest System Acres	Revised Forest Plan Reference Management Area Design Criteria
6	Rare Upland Communities	112	Part 2, p. 32; Part 3, p. 102
9	Water and Riparian Communities	455	Part 2, p. 34; Part 3, p. 103
14	Ouachita Mountains, Habitat Diversity Emphasis	4,435	Part 2, p. 35; Part 3, p. 108
17	Semi-Primitive Area – (Including Chinquapin Walk In Turkey Area)	7,060	Part 2, p. 37; Part 3, p. 111
20	North Fork Saline Wild and Scenic River	2,520	Part 2, p. 39; Part 3, p. 118
	TOTAL	14,582	Proposed action calculated at 14,700 which is less than a 1% variation in total acres.

History of the Planning Process

A Project Announcement Letter (PAL) or “scoping letter” was mailed to interested publics on July 19, 2019, requesting input on the proposed actions regarding management of the North Fork Saline Project Area. The project was also published in the Ouachita National Forest Schedule of Proposed Actions. No comments were received.

Decisions to Be Made

The District Ranger must decide which alternative to select. The District Ranger must also determine if the selected alternative would or would not be a major Federal action, significantly affecting the quality of the human environment.

Chapter 2

Alternatives Including the Proposed Action

Alternative Design

Alternatives Documented in Detail

Three (3) alternatives were identified by the Interdisciplinary Team (IDT) and approved by the Responsible Official to be evaluated and documented in detail:

- No Action Alternative
- Proposed Action
- No Herbicide

No Action

No-Action does not mean that activities in the project area would not occur. Road maintenance for public safety would continue. The area would continue to be accessible for outdoor recreation purposes. The Forest Service would respond to wildfires. Salvage operations and/or suppression of insect or disease outbreaks could take place. It is also possible that management activities qualifying as categorical exclusions (36 CFR Part 220) could take place in the project area.

Proposed Action

See Appendix A for list of activities by compartment and stand. Maps can be found online at www.fs.usda.gov/project/?project=55319.

Seed tree Harvest with Reserves. In this even-aged management method, overstory pine trees would be reduced to approximately 10 to 15 square feet of basal area per acre and serve as seed trees to produce a new age class of regeneration. Residual seed trees would be retained for the life of the regenerated stand as older sawtimber legacy trees.

Shelterwood Harvest with Reserves. In this even-aged management method, overstory pine trees would be reduced to approximately 25 to 30 square feet of basal area per acre and serve as seed trees to produce a new age class of regeneration. When it is determine, this BA would be reduced to the level of seed tree harvest standard. The residual seed trees would, partly, be retained for the life of the regenerated stand as older sawtimber legacy trees.

Per Revised Forest Plan, Table 3.2 (p. 81), the maximum size of regeneration area for pine and pine/hardwood types is 40 acres. The maximum size of regeneration area may be exceeded with approval of the Forest Supervisor up to a maximum of 80 acres for pine and pine/hardwood types (Footnote, Table 3.2).

Clearcut Harvest of Loblolly Pine. In this even-aged management method, overstory off-site loblolly pine trees would be removed and replace with a new age class of native shortleaf

pine trees. Revised Forest Plan design criteria FR005, FR0009/Table 3.2, and Table 3.15 identify parameters associated with even-aged management. The management practice of clearcut harvest has been selected to accomplish replacement of this forest type that is outside its natural range (OBJ11, p. 60). The Revised Forest Plan provides that maximum size of regeneration areas may be exceeded with approval of the Forest Supervisor up to a maximum of 80 acres for pine and pine-hardwood forest types (FR009/Table 3.2, page 80; Table 3.15, page 111). The Revised Forest Plan also authorizes utilization of clearcutting for the purpose of restoring native forests on lands that currently support non-native tree species (FR010, page 82). The proposed clearcutting of loblolly pine plantations is based on reasonable and prudent silvicultural practices of Ouachita National Forest lands and is optimal treatment for the primary purpose of restoring shortleaf pine. Utilization of clearcutting as a harvest method and applying treatment to no more than 80 contiguous acres, are consistent with the objective of the Revised Forest Plan to replace off-site loblolly pine with shortleaf pine and native hardwoods. Clear cut harvest would allow for mechanical site prep which consist of ripping the soil so planting native shortleaf pine seedlings could occur. In addition, other methods of mechanical site prep may be needed to establish stands.

Site Preparation with Herbicide and Prescribed Burning. Treatment for the purpose of preparing sites for natural pine regeneration involves felling and/or herbicide treatment of residual hardwoods such as oaks, hickory, maple, elm, and other species in all size age classes after harvest has occurred. Chainsaw and/or other manual tools would be used to fell hardwood stems. Herbicide (triclopyr-amine, triclopyr-ester, imazapyr, and glyphosate) would be used to treat cut stumps and/or foliage of hardwoods that are less than six feet in height. The area then would be prescribed burned. A hardwood component would be retained in the regenerated stand at a rate of 10% to 30% of the total trees per acre. Existing fruit-bearing and den trees would be favored in order to obtain the hardwood component. Following the harvest of overstory pine trees the hardwood components of these stands would be reduced to a basal area of approximately 5 square feet per acre. Site preparation may also include mechanical scarification in order to increase the chance of natural regeneration.

Reforestation—Hand/Auger Planting. These sites would be monitored and, if an adequate amount of pine natural regeneration (target level of 250-500 seedling per acre—Revised Forest Plan, Table 3.5, p. 83) is not established in a timely manner after the seed tree/shelterwood harvest, hand planting shortleaf pine would be used to achieve desired stocking levels.

Commercial Thinning. Pine stands would be thinned to a residual basal area based on the average stand diameter. Damaged, diseased, suppressed, and poorly formed trees would be targeted first for removal. Post-thinning stocking levels would meet the basal area guides listed in the Revised Forest Plan, Table 3.6, Thinning Guide by Community Group. Pursuant to Revised Forest Plan Design Criteria FI005, deviations from these guides are allowable if site-specific conditions warrant, subject to approval by the project Responsible Official. Some pine plantations, including loblolly plantation, ranging from 20 to 50 years of age would be thinned.

Connected activity:

Midstory Removal. Following commercial thinning (not including all thinned stands), some pine trees measuring less than five inches in diameter at breast height (dbh), and some hardwood stems measuring one inch and larger dbh, would be felled with chainsaw or other hand tools, or treated with herbicide (triclopyr-amine, triclopyr-ester, imazapyr, and glyphosate) using frill girdle (hack and squirt), injection, or cut surface application methods.

Stand Improvement-Release. To ensure a viable stand, a minimum of 300 shortleaf pine seedlings per acre and 25 hardwood seedlings (preferably a hard mast species) per acre should be free to grow without direct competition from vegetation for sunlight, moisture and nutrients. Pine and hardwood seedlings would be released as needed, with treatment consisting of felling hardwood stems such as oaks, hickory, maple, elm, and other species with chainsaws or other hand cutting tools. Herbicide (triclopyr-amine, triclopyr-ester, imazapyr, and glyphosate) would be applied using frill girdle (hack and squirt), injection, cut surface, or directed foliar spray methods. Treatment would occur in all size classes.

Prescribed Burning-Fuel Reduction, Control Understory Species, and Ecosystem Restoration. This activity would be implemented during the dormant and growing seasons (described below). Proposed burn areas would be burned as needed to reach a natural fire regime in this area. The prescribed burn frequency would be based on the current fuel loads, the priority of the unit and reasonable accessibility to achieve the desired condition. These are also considered when determining timing or season and intensity of the prescribed burn.

Growing Season Prescribed Burning – These burns would be implemented during the spring and summer months between leaf emergence in late March and April and leaf fall in late October and November. The burns involve application of controlled, low to moderate intensity fire to control competing vegetation (hardwoods), prepare sites for seeding, and perpetuate fire dependent species (shortleaf pine – bluestem). Vegetation three inches and less in diameter at the ground level is targeted for eradication; however, some larger diameter vegetation may be damaged. This would result in less competition for pine seedlings and other desirable fire-dependent species while creating an open understory to stimulate growth of native grasses and forbs and increased foraging opportunities for browsing animals.

Dormant Season Prescribed Burning – These burns would be implemented after leaf fall and before leaf emergence during late fall and winter months. Moderate to high intensity fire would be employed to reduce accumulated fuels, stimulate growth of native vegetation, and improve wildlife habitat. Approximately 80 percent of the area would be burned with expected fuel reduction of approximately 30 percent. Some duff would be retained for soil protection. Some larger vegetation may be lost, however, two inches in dbh and less in diameter would be targeted for reduction to

create an open understory, stimulating growth of native grasses and forbs, and increased foraging opportunities for browsing animals.

Fireline Construction. A line up to 10-feet wide would be bladed to bare mineral soil using a bulldozer, removing ground vegetation and small trees. The fireline would meander around large trees, leaving them in place. After the burns are completed, these firelines would be waterbarred and seeded with native grasses and forbs where needed to restore vegetative cover to the exposed soil.

Fireline Reconstruction/Fireline Maintenance. Up to a 10-foot wide swath of brush and ground vegetation would be removed from existing firelines by blading using a bulldozer. After the burns are completed, these firelines would be waterbarred and seeded with native grasses and forbs where needed to restore vegetative cover to the exposed soil.

Wildlife Habitat Improvement-Midstory Reduction. Designated hardwood and pine midstory trees would be removed by severing the stems with chainsaw or other hand tools or by application of the herbicide (triclopyr-amine, triclopyr-ester, imazapyr, and glyphosate) applied by frill girdle (hack and squirt), stem injection, cut surface, or foliar spray. Soft-mast producing trees in the midstory such as dogwood and serviceberry, and trees containing vines of wild grapes are typically not treated, depending upon their densities within the area treated. Snags and den trees (living trees with cavities) would be retained. Residual hardwoods in the overstory and midstory would include representatives of the red oak, white oak and hickory groups to ensure a variety of hard (acorns/nuts) and soft mast (fruits/berries) types are available for wildlife consumption. Treatment would transition stand composition toward historic open, pine-bluestem conditions.

Wildlife Opening Construction. Constructed wildlife opening size would be approximately 1 to 2 acres. Timber volume associated with wildlife enhancement projects would be sold, if accessible and marketable. Remaining vegetation would be cleared and disturbed soils would be fertilized, limed and seeded with native grasses and forbs to provide open area habitat for wildlife.

Wildlife Opening Decommission. Four wildlife openings within MA20 would be decommissioned. Decommissioning activities would be similar to road decommissioning depending on site conditions and these areas would be allowed to revert to natural vegetation.

Wildlife Pond Construction. One wildlife pond would be constructed which would range in size from 1/8 to 1/4 an acre in size. Pond would be designed to fill with water from adjacent drainage features and direct rainfall. Pond banks would be seeded and/or planted with grasses, legumes, and shrubs or trees beneficial to wildlife. Merchantable pine timber present on sites where ponds are constructed would be salvaged, if accessible. Associated hardwood materials could be utilized for firewood, if accessible. Native terrestrial or aquatic plants may be planted in and around the new ephemeral wetland to encourage wildlife use.

Large logs and branches would also be placed along the bank edges to increase potential use by such species as salamanders, frogs, and other amphibians and reptiles.

Wildlife Pond Rehabilitation/Maintenance. Restoration of existing wildlife ponds would be done by reshaping banks; clearing trees and brush; and repairing failing dams. Disturbed soils would be rehabilitated by seeding and/or planting with native species and by fertilizing, liming, and mulching to provide enhanced foraging opportunities for wildlife.

Nest Box Installation. Eastern Blue Bird, Carolina Wren, and Wood Duck nest boxes and bat boxes would be installed throughout the project area, concentrating in openings and near wildlife waterholes. This is primarily for secondary cavity nesters but other species may also use them.

Glade Restoration. Encroaching, undesirable woody species would be eliminated by chainsaw felling and prescribed burning. Prescribed burning would be utilized to eliminate remaining litter to release dormant seed beds of native plants. Some herbicide may also be used in very limited specific locations but would not be used on any native glade species.

Temporary Road Construction. Roads would be constructed to access and haul timber from stands proposed for commercial harvest. Per TH009 on page 86 of the Revised Forest Plan, temporary roads will be decommissioned and revegetated upon termination of management activity. (USDA Forest Service, 2005a)

Road Maintenance/Reconstruction. System road reconstruction would be required to support management activities, reduce erosion and sedimentation, and ensure safe travel on the existing road network. Activities could include any road improvements or realignment that results in an increase of an existing road's traffic service level, expands its capacity, changes its original design function, or relocates an existing road or portions of an existing road and treatment of the old roadway.

Road Decommission. Several system roads are no longer useable and are effectively already decommissioned by nature. In addition, user created roads, old roadways created by past entries and closed roads not needed for future management activities would be closed and decommissioned. Methods of decommissioning range from blocking the road entrance (earthen mound) to full obliteration, and may include re-vegetation, water-barring, establishing drain-ways, removing unstable road shoulders, re-contouring and restoring natural slopes. Some user created roads and old roadways created by past entries are needed for timber harvest, but would be closed and decommissioned post-harvest (Forest Wide Design Criteria TR005, TR007). Almost half of this mileage is on FS road 809, which is located in MA20 and would be decommissioned and obliterated (western half only).

Recreational Trailhead Parking Construction. New trailhead parking area would be constructed for the Wildcat Mountain Trailhead. The parking area will not exceed 0.5 acre and may include signs or an information board.

Road Closures. Several system roads would be closed and only used for administrative purposes.

No Herbicide

This alternative addresses Forest direction requiring analysis of an alternative to herbicide use when feasible and practical to accomplish management purposes. The No Herbicide Alternative is the same as the Proposed Action except that chainsaws or other hand tools, instead of herbicide application, would be utilized for site preparation, release, midstory removal, and overstory development.

Technical Requirements

The technical requirements described below apply to the Proposed Action and the No Herbicide Alternative.

Cultural Resources

HP1: Site Avoidance During Project Implementation

For cultural resource sites that are eligible for NRHP inclusion and for sites that the NRHP eligibility is undetermined: avoidance of historic properties would require the protection from effects resulting from the undertaking. Effects would be avoided by establishing clearly defined site boundaries and buffers around archeological sites where activities might result in an adverse effect. Buffers would be of sufficient size to ensure that integrity of the characteristics and values which contribute to the properties' significance would not be affected.

HP2: Site Protection During Prescribed Burns

- (1) *Firelines.* Historic properties located along existing non-maintained woods roads used as fire lines will be protected by hand-clearing those sections that cross the sites. Although these roads are generally cleared of combustible debris using a small dozer, those sections crossing archeological sites will be cleared using leaf blowers and/or leaf rakes. There will be neither removal of soil, nor disturbance below the ground surface, during fireline preparation. Historic properties and features located along proposed routes of mechanically-constructed firelines, where firelines do not now exist, will be avoided by routing fireline construction around historic properties. Sites that lie along previously constructed dozer lines from past burns where the firelines will be used again as firelines, will be protected during future burns by hand clearing sections of line that cross the site, rather than re-clearing using heavy equipment. Where these activities will take place outside stands not already surveyed, cultural resources surveys and regulatory consultation will be completed prior to project implementation. Protection measures, HP1, HP3, and HP4, will be applied prior to project implementation to protect historic properties.
- (2) *Burn Unit Interior.* Combustible elements at historic properties in burn unit interiors will be protected from damage during burns by removing excessive fuels from the feature

vicinity and, as necessary, by burning out around the feature prior to igniting the main burn, creating a fuel-free zone. Burn out is accomplished by constructing a set of two hand lines around the feature, approximately 30 to 50 feet apart, and then burning the area between the two lines while the burn is carefully monitored. Combustible features located in a burn unit will also be documented with digital photographs and/or field drawings prior to the burn. Historic properties containing above ground, non-combustible cultural features and exposed artifacts will be protected by removing fuel concentrations dense enough to greatly alter the characteristics of those cultural resources. No additional measures are proposed for any sites in the burn interior that have been previously burned or that do not contain combustible elements or other above ground features and exposed artifacts as proposed prescribed burns will not be sufficiently intense to cause adverse effects to these features.

- (3) *Post-Burn Monitoring.* Post-burn monitoring may be conducted at selected sites to assess actual and indirect effects of the burns on the sites against the expected effects. State Historic Preservation Office (SHPO) consultation will be carried out with respect to necessary mitigation for any sites that suffer unexpected damage during the burn or from indirect effects following the burn.

HP3: Other Protection Measures

If it is not feasible or desirable to avoid an historic property that may be harmed by a project activity (HP1), then the following steps will be taken: (1) In consultation with the Arkansas SHPO, the site(s) will be evaluated against National Registry Historic Places (NRHP) significance criteria (36 CFR 60.4) to determine eligibility for the NRHP. The evaluation may require subsurface site testing; (2) in consultation with the Arkansas SHPO, tribes and nations, and with the Advisory Council of Historic Preservation (ACHP) if required, mitigation measures will be developed to minimize the adverse effects on the site, so that a finding of No Adverse Effect results; (3) the agreed-upon mitigation measures will be implemented prior to initiation of activities having the potential to affect the site.

HP4: Discovery of Cultural Resources during Project Implementation

Should unrecorded cultural resources be discovered, activities that may be affecting that resource will halt immediately; the resource will be evaluated by an archaeologist, and consultation will be initiated with the SHPO, tribes and nations, and the ACHP, to determine appropriate actions for protecting the resource and mitigating adverse effects. Project activities at that locale will not resume until the resource is adequately protected and until agreed-upon mitigation measures are implemented with SHPO approval.

Biological

All proposed Road work and Fire control lines within MA20 (1/4 mile each side of North Fork Saline River)

- Activities for fire-line and road treatments within MA20 will use methods with the least amount of disturbance necessary to meet safety and to help maintain or restore the designated ORVs.
- Fire-line construction or re-construction connecting or crossing North Fork Saline River will only use hand tools to construct the control line (hand-line). The hand-line will

begin at the stream channel to at least a minimum distance of 100 feet from the edge of the stream channel.

- All fire control lines would be water barred and seeded after construction to limit the potential for sediment.

Soils

Allow heavy equipment operations on hydric soils, soils with a severe compaction hazard rating, and floodplains with frequent or occasional flooding hazard only during the months of July through November. Operations during December through June are allowed with the use of methods or equipment that do not cause excessive soil compaction. This standard does not apply to areas dedicated to intensive use, including but not restricted to administrative sites, roads, primary skid trails, log decks, campgrounds, and special use areas. (Revised Forest Plan, SW001, p. 74)

Allow heavy equipment operations on soils that have a high compaction hazard rating only during the months of April through November. Operations during December through March are allowed with the use of methods or equipment that does not cause excessive soil compaction. This standard does not apply to areas dedicated to intensive use, including but not restricted to administrative sites, roads, primary skid trails, log decks, campgrounds, and special use areas. (Revised Forest Plan, SW002, p. 74)

These standards apply to the stands displayed in the tables below *where operations would occur on* soil mapping units with a mod-high, high and/or severe compaction hazard rating. If the resulting timber sale payment units do not include any high risk soils, then limited operating seasons would not apply.

Stands With a Limited Operating Season Due to Compaction (Table 2.1)

Compartment	Stand	Harvest	Compaction
1435	14	Thin	Moderate-High
	17	Thin	Moderate-High
1436	18	Thin	High
	31	Shelterwood	Severe
1437	10	First Thin	Severe
1450	6	Seed Tree	Moderate-High
	6	Seed Tree	Severe
	7	Clear Cut	Moderate-High
	7	Clear Cut	Severe
	8	Thin	Moderate-High
	9	Thin	Moderate-High
	9	Thin	Severe
	10	Thin	Moderate-High
	12	Thin	Moderate-High
	12	Thin	Severe
	13	Thin	Moderate-High
	13	Thin	Severe
	17	Seed Tree	Severe
	22	Seed Tree	Severe
	29	First Thin	Severe
1451	2	Seed Tree	Moderate-High
	3	Thin	Severe
	17	Thin in 5	Moderate-High
1452	12	Clear Cut	Severe
	34	Thin	Moderate-High
	34	Thin	Severe
1453	40	Thin	Moderate-High

Stands With a Limited Operating Season Due to Flooding (Table 2.2)

Compartment	Stand	Harvest	Floodplain
1435	2	First Thin	Frequent
	5	Clear Cut	Frequent
	9	First Thin	Frequent
	14	Thin	Occasional
	16	Thin	Frequent
	17	Thin	Frequent
	17	Thin	Occasional
	19	Clear Cut	Frequent
1450	6	Seed Tree	Occasional
	7	Clear Cut	Occasional
	8	Thin	Occasional
	9	Thin	Occasional
	12	Thin	Occasional
	13	Thin	Occasional
	22	Seed Tree	Occasional
	28	Seed Tree	Frequent
	29	First Thin	Frequent
1451	3	Thin	Occasional
	13	Clear Cut	Frequent
	15	Thin in 5	Frequent
	21	Thin in 5	Frequent
	40	Thin	Frequent
1452	33	First Thin	Frequent
	34	Thin	Occasional

Scenery

All Units

Per the *Scenery Treatment Guide for Southern Regional National Forests* (USDA Forest Service 2007b), the following mitigation measures would be applied, where possible, to lessen visual effects:

- Flowering and other visually attractive trees and understory shrubs should be favored when leaving vegetation.
- Native wildflowers and/or shrubs and/or trees with showy flowers and/or fruits should be favored or introduced.
- Cut and fill slopes should be revegetated to the extent possible.
- In seen areas, consider seasonal color of vegetation. For instance, using warm season grass mixes that turn seasonally brown or gray instead of green.
- During temporary road construction, slash and root wads should be eliminated or removed from view in the immediate foreground to the extent possible.
- Special road and landing design should be used. When possible, log landings, roads and bladed skid trails should be located out of view to avoid bare mineral soil observation from Concern Level 1 and 2 travel routes.
- Root wads and other unnecessary debris should be removed or placed out of sight within 200 feet of key viewing points.
- Stems should be cut to within 6 inches of the ground in the immediate foreground.
- Leave tree marking or unit boundary marking should be applied so as to not be visible within 200 feet of Concern Level 1 and 2 travel routes which include Hwy 9, Winona Scenic Drive FSR132, CR48, CR57, CR105, FSR114, FSR179, FSR715, FSR132C, FSR212, Y35P, Y36M, Y36L, and 2897.
- Slash should be removed, burned, chipped, or lopped to within an average of 2 feet of ground, when visible within 100 feet on either side of Concern Level 1 travel routes. Concern Level 1 routes include the Wildcat Mountain Bike Trail, Hwy 9, Winona Scenic Drive FSR132, CR48, CR57, CR105, 809, Y35P, Y36L, Y36M, 114, 179, 28970, CR105, CR198.
- Slash would be removed, burned, chipped, or lopped to within an average 4 feet of Concern Level 2 routes include CL2, 212, 132C, 715, Y35K, 835.
- Consider scheduling work outside of major recreation seasons.
- The scenery impact of roads and constructed fire lines should be blended so that they remain subordinate to the existing landscape character in size, form, line, color, and texture.
- Stems should be cut to within 6 inches of the ground in the immediate foreground.
- Cut banks should be sloped to accommodate natural revegetation.
- Along property lines, leave some hardwoods along a 100 foot buffer.
- Clearcut areas should have an undulating edge to avoid a solid wall effect and should transition with adjacent stands.
- Along property lines, leave some hardwoods along a 100 foot buffer.

Public Health and Safety

During prescribed burning activities, sign travel-ways as needed notifying the public there may be smoke along the road. Flaggers or warning signs would be positioned along the travel ways during active flaming. Inform the public of potential burn days, times, information contacts, and suggested alternatives for those concerned with smoke. Notify local, county and state law enforcement that burning will take place.

Any work associated with proposed management activities in the vicinity of the pipeline or powerline will be coordinated with utility permit holders.

Alternatives Considered But Eliminated from Detailed Study

Proposed Action without Harvest Activity

An alternative similar to the Proposed Action but without harvest applications was considered by the ID Team but eliminated from detailed analysis because the ID Team concluded that a No Action Alternative adequately addressed the overall effects of a no harvest alternative.

Proposed Action without Prescribed Burning

An alternative similar to the Proposed Action, but without the application of prescribed burning (other than existing authorized burn decisions), was considered by the ID Team but eliminated from detailed analysis. The ID Team concluded that a No Action Alternative adequately addressed the overall effects of a no prescribed burning alternative.

Proposed Action without Temporary Road Construction or Road Reconstruction

An alternative similar to the proposed action, but with no construction of temporary roads or road reconstruction, was considered by the ID Team but eliminated from detailed analysis. Utilizing the existing road system in its current state would allow for 327 acres of proposed regeneration harvest. This would result in the project only providing 2.23% early seral habitat and does not meet the purpose and need of this project of providing a minimum of 6% early seral habitat in suitable acres for MA 14 (Revised Forest Plan, WF001).

Other Past, Present, and Reasonably Foreseeable Future Actions

Salvage operations and/or suppression of insect or disease outbreaks may be authorized under the following decisions: Program and Procedure for Salvage of Dead, Down, Damaged, or Hazard Trees (USDA, 2008); Implementation of Forest Insect and Disease Suppression Actions (USDA, Implementation of Forest Insect and Disease Suppression Actions, 2009).

Summary Comparison All Alternatives

The following tables provide a comparison of alternatives utilizing both quantitative and qualitative measures.

Summary Comparison of Management Activities by Alternative (Table 2.3)

Activity and Measure	No Action	Proposed Action	No Herbicide
Seed Tree Harvest (acres)	0	459	459
Commercial Thinning Harvest (acres)	0	2,349	2,349
Clearcut (acres)	0	405	405
Reforestation Site Preparation Prescribed Burning and Herbicide (acres)	0	1,324	0
Reforestation Site Preparation Prescribed Burning and Chainsaw (acres)	0	0	1,324
Stand Improvement Regeneration Release (Chainsaw and Herbicide) (acres)	0	1,130	0
Stand Improvement Regeneration Release (Chainsaw) (acres)	0	0	1,130
Stand Improvement Midstory Removal (acres) (Chainsaw and Herbicide)	0	1,964	0
Stand Improvement Midstory Removal (acres) (Chainsaw)	0	0	1,964
Prescribed Burning Fuel Reduction (acres)	0	14,700	14,700
Fire line Construction/Maintenance (miles)	0	6.5	6.5
Wildlife Pond Construction	0	1	1
Nest Box Installation (boxes)	0	2	2
Road construction (miles)	0	0	0
Road reconstruction/relocation/maintenance (miles)	0	26	26
Temporary Road Construction (miles)	0	8	8
Road decommission (miles)	0	4.4	4.4
Road closure (miles)	0	0	0
Road opening (miles)	0	0.25	0.25

Summary Comparison of Effects on Environment by Alternative (Table 2.4)

Effect	No Action	Proposed Action	No Herbicide
Revenue/Cost Ratio	N/A	1.03	1.11
Soil Loss Below Threshold	Yes	Yes	Yes
Acres of Early Seral Habitat Created	0	987	987
Herbicide Application/ Human Exposure Scenario Hazard Quotients > 1	No	Yes	No
Open Road Density (mi/mi²)			
Management Area 6	NA	NA	NA
Management Area 9	NA	NA	NA
Management Area 14	1.38	1.38	1.38
Management Area 17	1.2	1.2	1.21
Management Area 20	1.23	1.23	1.23
Risk Level to Beneficial Uses			
Upper North Fork Saline River - 80402030101	Low	Moderate	Moderate

Chapter 3

Affected Environment and Environmental Consequences

Analysis Methods

Air Quality – The emissions were calculated using a range of consumption values (in tons per acre) for the largest unit based on best available information and professional judgment (Region 8 Air Quality Specialist Melanie Pitrolo). Consumption is assumed to be between two and four tons per acre, with an average emission factor of 12 pounds of fine particulate matter per ton of fuel consumed.

#acres x consumption (4 tons/acre) x emission factor (12 lbs/ton) divided by 2000

Soils – The ONF Universal Soil Loss Equation (USLE) model was used to predict whether soil loss from proposed management actions would be below maximum allowable thresholds. The model was developed by ONF personnel, and modified by Forest Soil Scientists.

Water Quality – The Aquatic Cumulative Effects (ACE) model was used to determine the possible cumulative impacts of management activities on water quality. This model addresses the effects of timber harvesting, roads and wildlife management activities on water quality and fisheries. The model calculates sediment loadings resulting from proposed management activities. The model also assigns a risk rating of low, medium or high for adverse effects to aquatic beneficial uses. The model was developed for the Ouachita National Forest in Arkansas and Oklahoma and is specific to the physiographic zones within the Ouachita National Forest.

Financial Efficiency – Quick-Silver (version 7.0) was used to determine the financial efficiency of each Alternative. This program is a project analysis tool that utilizes a Microsoft Access database for use by forest managers to determine the economic performance of long-term investments.

Public Health and Safety – SERA (Syracuse Environmental Research Associates, Inc.) Pesticide Human Health and Ecological Risk Assessments were used to analyze the risks associated with the herbicides proposed for use in this project. Project specific SERA worksheets were completed for herbicides triclopyr-amine, triclopyr-ester, imazapyr, and glyphosate to determine HQs (Hazard Quotients) for the proposed application rates of these herbicides. An HQ is the ratio of a projected level of human exposure divided by some index of acceptable exposure or an exposure associated with a defined risk. HQs of 1.0 or less indicate scenarios with acceptably low risk.

Air Quality

Current Conditions

The project area lies within lands designated as Class II with respect to the air resource. The Clean Air Act defines a Class II area as “a geographic area designated for a moderate degree

of protection from future degradation of the air quality.” A Class I Area is a geographic area designated for the most stringent degree of protection from future degradation of air quality. The closest Class I Area is the Caney Creek Wilderness Area, approximately 100 miles southwest of the project area. The Upper Buffalo Wilderness area is located approximately 90 miles north.

Existing emission sources occurring within the project area consist mainly of mobile sources. These would include, but are not limited to, combustion engines (such as those found in motor vehicles); dust from unpaved surfaces; smoke from local, county, agricultural, and forest burning; restaurants; and other activities. Arkansas state air regulators monitor ozone and fine particulate matter at several locations near the project area; none of these monitors have measured values greater than air quality standards set by the Environmental Protection Agency (EPA). Of the six criteria air pollutants, one county in the state (includes the town of West Memphis) is designated a non-attainment area for ozone (US EPA, 2015).

Direct and Indirect Effects

No Action

The prescribed fire proposed in this project would not occur, therefore there would be no additional smoke generated from the proposed prescribed burning, and no degradation of air quality. The amount of fuel consumed on each of the prescribed burning blocks would average 4 tons per acre. Under the No Action Alternative, this reduction in fuels would not take place. In the event of a wildfire, this fuel would be present, and because wildfires occur without regard to a prescription, climatic conditions might exist that could contribute to the creation of high levels of ozone, PM-10, and PM-2.5 downwind of the fire.

Proposed Action and No Herbicide

Occasional brief exposure of the general public to low concentrations of drift smoke is more a temporary inconvenience than a health problem. High smoke concentrations can, however, be a very serious matter. Human health effects related to particulate matter in smoke include: increased premature deaths; aggravation of respiratory system or cardiovascular illnesses; and changes in lung function, structure, and natural defense. Smoke also becomes a safety issue when it affects visibility on roadways. Smoke can also have a nuisance odor.

Smoke can have negative short-and long-term health effects. Fire management personnel exposed to high smoke concentrations often suffer eye and respiratory system irritation. Under some circumstances, continued exposure to high concentrations of carbon monoxide at the combustion zone can result in impaired alertness and judgment. The probability of this happening on a prescribed fire is, however, virtually nonexistent because of limited exposure time.

Smoke is composed of hundreds of chemicals in gaseous, liquid and solid forms, some of which are toxins including carbon monoxide, particulate matter, acrolein and

formaldehyde. Over 90 percent of the particulate emissions from prescribed fire are small enough to enter the human respiratory system. The repeated, lengthy exposure to relatively low smoke concentrations over many years can contribute to respiratory and cardiovascular problems.

Calculations of emissions from the proposed project were conducted to assess the increase in emissions loading in the project area. Consumption is assumed to be four tons per acre, with an average emission factor of 12 pounds of fine particulate matter per ton of fuel consumed. Calculations of emissions show that the increase as a result of this project would be 120 tons from the largest prescribed burn unit of 5,000 acres.

All prescribed burning activities would be conducted in accordance with the Region 8 Smoke Management Guidelines (Guidelines) in order to alleviate the smoke related impacts outlined above. Smoke management planning in accordance with the Guidelines has been successful in protecting health and safety during past activities. The Guidelines require that smoke dispersion modeling be conducted for most burn units to ensure that the smoke management objectives are met. If modeling shows potential impacts, adjustments or mitigations would be necessary in order to go forward with the burn. Each burn unit would be planned in accordance with the Guidelines such that specific parameters are met, including wind speeds and wind directions. While a few larger units would have the potential to transport smoke beyond the National Forest, potential impacts would be mitigated by burning with a wind direction away from the Forest boundary.

Based on existing air quality information, no long-term adverse impacts to air quality standards are expected from the proposed project. The proposed project is designed to ensure that the Guidelines are followed, and as such does not threaten to lead to a violation of any Federal, State or Local law or regulation related to air quality.

Cumulative effects

No Action

No cumulative effects would occur because no prescribe burning would be conducted under the No Action Alternative; there would be no additive effect.

Proposed Action and No Herbicide

The cumulative effects of prescribed burning on air quality consist of the downwind impact of multiple simultaneous prescribed burns, in addition to the other emissions in the area. These cumulative effects are rather short-lived. Once the burn is over and the smoke dissipates, the effect is over. Impacts to air quality would generally be confined to no more than a few hours or at most, 1-2 days. It is acknowledged that multiple simultaneous prescribed burns could cumulatively increase particulate levels. While it is difficult or nearly impossible to quantify such emissions in a planning analysis, voluntary compliance with the

State of Arkansas Smoke Management Program insures compliance with applicable Federal and State regulations governing open burning.

Cultural and Historical Resources

Current Conditions

An effect to a cultural resource is the "...alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register." (36 CFR 800.16(i))

Any project implementation activity that has potential to disturb the ground has potential to directly affect archeological sites, as does the use of fire as a management tool. Specific activities proposed that have potential to directly affect cultural resources include timber harvesting and associated log landings, skid trails, and temporary roads, prescribed burning and associated fireline construction and road maintenance or reconstruction where ground disturbance takes place outside existing right-of-way area.

Proposed activities that do not have potential to affect cultural resources, and therefore, are not considered undertakings for purposes of this project include: Non-commercial thinning, timber stand improvements, on-going maintenance of existing Forest roads or reconstruction previously surveyed roads where ground disturbance does not take place outside existing road prisms and existing drainage features, rehabilitation/closure of temporary roads, log landings, and skid trails using non-ground disturbing methods, road decommissioning using non-ground disturbing methods.

Direct & Indirect Effects

No Action

There would be no change in effects from the current condition, and the potential threat to integrity of cultural resources would remain unchanged.

Proposed Action and No Herbicide

In general, proposed activities have the potential to affect cultural resources by encouraging increased visitor use to those areas of the Forest in which cultural resources are located. Increased visitor use of an area in which archeological sites are located can render the sites vulnerable to both intentional and unintentional damage. Intentional damage can occur through unauthorized digging in archeological sites and unauthorized collecting of artifacts from sites. Unintentional damage can result from such activities as driving motorized vehicles across archeological sites, as well as from other activities, principally related to dispersed recreation, that lead to ground disturbance. Effects may also include increased or decreased vegetation on protected sites due to increased light with canopy layer reduction outside of the protected buffer.

Proposed access changes, soil restoration work and opening of forested areas from timber harvest can impact cultural resources. Surface artifacts or features may be exposed, disturbed or removed due to increased access and visibility.

Project components that have potential to directly affect archeological sites are primarily timber, prescribed fire, road management, and some wildlife management activities. Adverse effects to cultural resources resulting from proposed activities could be avoided provided site avoidance and site protection measures are properly applied to the known historic properties (see Chapter 2, technical requirements). In that instance, project activities would not be expected to adversely affect archeological sites.

Cumulative Effects

No Action, Proposed Action, and No Herbicide

There would be no additive effect from this project because there are no past, present or reasonably foreseeable future actions affecting cultural resources.

Recreation, Scenery, Wilderness, Roadless Areas

Current Conditions

The North Fork Saline project area is located approximately 45 miles west of Little Rock, Arkansas, the state capital, and is moderately used by the public for recreation. The main recreation uses are dispersed camping, hunting, mountain biking, and driving for pleasure. There are no developed recreation areas within the project. A portion of the area is utilized by large groups through special use permits for running and mountain bike events throughout the year. Chinquapin Mountain Walk-In Turkey Hunting Area is located in the northwest portion of the project and receives moderate use during hunting seasons. Wildcat Mountain Bike Trail, an 8.5 mile loop trail, is located within the area. Trails are open year round for public use. Located along the northern boundary of the project area is the Winona Scenic Drive, an auto tour route which follows Forest Service Road 132, traveling from Arkansas State Hwy 9 west for approximately 9 miles until it leaves the project area. The closest wilderness area, Flatside, is located adjacent to the northwest end of the project area. Little Blakely, the closest roadless area, is located 20 miles southwest of the project area, and North Fork Saline River, the closest Wild and Scenic River (eligible), flows through the project area.

Characteristics of the watershed include moderate to strongly rolling hills and long low ridges with narrow valleys positioned east to west. Dense forested slopes are visible from valley bottoms and ridgetops. The dominant species is shortleaf pine-oak in the uplands, and hardwood dominated forest in the bottoms and drainages. There are a number of hardwood dominated stands scattered throughout the project area.

The project area contains the Scenic Integrity Objective (SIO) levels of Very High (20%), High (34%), Medium (41%), and Low (5%). Very High scenic integrity refers to landscapes where the valued landscape character “is” intact with only minute, if any, deviations. The

existing landscape character and sense of place is expressed at the highest possible level. High scenic integrity refers to landscapes where the valued landscape character “appears” intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely and at such scale that they are not evident. Moderate scenic integrity refers to landscapes where the valued landscape character “appears slightly altered.” Noticeable deviations must remain visually subordinate to the landscape character being viewed. And Low scenic integrity refers to landscapes where the valued landscape character “appears moderately altered.” Deviations begin to dominate the valued landscape character being viewed but they borrow valued attributes such as size, shape, edge effect and pattern of natural openings, vegetation type changes or architectural styles outside the landscape being viewed.

An SIO of High is assigned to a 200-foot corridor on each side of concern level one trails, which includes the Wildcat Mountain Bike Trail. National Forest land within this trail corridor is identified as suitable for timber production at this time. The foreground area along sensitivity concern level one roads which includes Hwy 9, Winona Scenic Drive FSR132, CR48, CR57, CR105, CR198, CR74, FSR114, FSR179, FSR715, Y35P, Y36M, Y36L, 28970 and the foreground area along sensitivity concern level two roads which include FSR132C, FSR135, and Y51D will not exceed ¼ mile and will contain both suitable and unsuitable acres for timber production. Mitigation factors outlined in the Scenery Treatment Guide – Southern Regional National Forests (April 2008) will be followed to reduce impacts to scenic integrity.

Direct, Indirect, & Cumulative Effects

No Action

There would be no disturbance to forest visitors, or an effect on scenery, because the proposed action would not occur.

Direct and Indirect Effects

Proposed Action and No Herbicide

Recreation - Wildcat Mountain Bike Trail has very limited parking on the side of the road in a densely forested stand. Parking will be expanded to include an entry and exit point, gravel base, designated parking spurs, and associated signs and information boards. Stands 2, 22, and 23 will be thinned to improve visual quality and enhance parking. This will occur on the north end of FSR179 and the intersection of FSR132.

Within the watershed there are 9.8 miles of road designated on the Motor Vehicle Use Map (MVUM) as open year round to highway legal vehicles in addition to 14 miles of additional public roads. The northern end of road Y36L, from the intersection of Y36M, is currently closed on MVUM. This .25 mile section of road is under permit for access to private inholdings. This section of road will become open to highway legal vehicles only.

Forest visitors may have a disturbance in the recreation experience from the sights and sounds of management activities such as logging trucks, machinery noise, and dust. Campers

North Fork Saline Project

and trail users may be temporarily displaced during logging and prescribed fire activities. Increases in wildlife food sources due to prescribed burning and wildlife habitat improvement may result in enhanced hunting and wildlife viewing opportunities. Harvest activities will be coordinated with low recreation seasons to help mitigate disturbances to the recreation experience.

Scenery - A large portion of the project area falls within the High Scenic Integrity Objective (SIO) level. In the short term, vegetation removal through harvest, wildlife habitat improvement, stand improvement, and prescribed burning would negatively impact the scenic quality of the area.

These management activities would result in dead and dying vegetation, slash and root wads. In the long term, these same activities would provide a more open view of the forest, enhancing the viewing depth where needed. Mitigation factors outlined in the Scenery Treatment Guide – Southern Regional National Forests (April 2008) will be followed to reduce impacts to scenic integrity.

Wilderness - Flatside Wilderness lies adjacent to the project area on the west end. The visitor's wilderness experience may be affected by the sights and sounds of harvest activities which occur adjacent to the wilderness. Harvest activities will be coordinated during low wilderness use seasons to help mitigate disturbances to the wilderness experience.

Roadless - There are no roadless areas within the project. The nearest one is approximately 20 miles away. Due to the distance from the project area there will be no effects on roadless areas.

Special Uses - There is one special use right-of-way (R-O-W) permit issued by the Ouachita National Forest within the project area. An underground gas pipeline with a 110 foot wide right-of-way. Any work associated with proposed management activities in the vicinity of the pipeline will be coordinated with utility permit holders. No effects of consequence on or from special uses are expected to result from any of the alternatives considered.

Cumulative Effects

Recreation - Dispersed and developed recreation visitors may be disturbed by sights and sounds of harvest activities proposed in this project, and in the Brown's Creek project, located to the north. Both projects could have activities implemented in the same year.

Wilderness - Visitors to Flatside Wilderness may be impacted by disturbances from the sights and sounds of harvest activities proposed in this project, in the Browns Creek project, located along the eastern wilderness boundary, and in the Upper Lake Winona project, located on the southern boundary of the wilderness area. All projects could have activities implemented in the same year.

Local Economy and Financial Efficiency

Current Conditions

The project area is in Saline and Perry Counties in Arkansas. Saline County's largest employer is the government (21.0%); followed by services (20.9%); then retail trade (17.4%). Perry County's largest employer is the government (24.7%); followed by farming (22.9%); then services (17.0%).

Forest Service land comprises 12.6% of Saline County's land base and 27.6% of Perry County's land base. (Headwaters Economics, 2020)

Direct and Indirect Effects

No Action

No additional jobs or revenue would be generated for the local community.

Proposed Action and No Herbicide

Many management actions are performed by contractors (site preparation, stand improvement, etc.). These activities would provide jobs to the local community and create a stream of revenue to local businesses.

Under The Proposed Action and the No Herbicide Alternative, there would be both costs and revenues associated with the sale of timber. Costs include activities that are directly involved with timber management (site preparation, timber sale administration, road maintenance, etc.) Revenues are generated from the sale of timber. QuickSilver7 was used to evaluate the financial efficiency of each alternative; these results are displayed in the table below.

Comparison by Financial Efficiency (Table 3.1)

Financial Measure	No Herbicide	Proposed Action
Present Value of Revenues (\$)	\$698,474.48	\$698,474.48
Present Value of Costs (\$)	\$627,291.53	\$675,652.74
Present Net Value (\$)	\$71,182.95	\$22,821.74
Revenue/Cost Ratio	1.11	1.03

The Revenue/Cost Ratio is highest for the No Herbicide Alternative.

Cumulative Effects

No Action

Future Forest Service contracts located within Saline and Perry Counties would occur, but there would be no additive effects on the local economy from not implementing the proposed actions.

Proposed Action and No Herbicide

There are no other projects in the vicinity of this project; therefore, there are no cumulative effects.

Transportation & Infrastructure

Current Conditions

Roads within the North Fork Saline Project area are used for a variety of purposes, including dispersed camping, vehicle touring, and hunting access. AR Hwy 9 runs along the eastern boundary of the project area accommodating travel north and south, FS Road 179 and 114 also travel north and south within the area; FS Road 132 runs across the northern boundary east to west and CR48 and CR57 also travel east to west within the area.

There are approximately 57 miles of National Forest System roads (NFSR) in the project area; about 28 miles are closed (administrative use only). There are also 15 miles of highway and county roads. The current Motor Vehicle Use Map (MVUM) designates NFSRs as follows: 12.3 miles open to highway legal vehicles only, yearlong; 9.8 miles open to all vehicles, yearlong.

Motorized mixed use occurs when a NFSR is designated for use by both highway-legal and non-highway-legal motor vehicles (FSM 7705). Motorized mixed use is allowed on 19.9 miles of roads within the project area. There are no designated motorized (OHV) trails.

The current Open Road Density (ORD) for Forest Service Land in the project area is 1.52 mi/mi²

Direct and Indirect Effects

No Action

No activities are proposed, therefore there would be no direct, indirect, or cumulative effects to access or to ORD.

Proposed Action and No Herbicide

Approximately .25 miles of FS system roads closed to all vehicles would be opened to the public. These changes to the motor vehicle use route designation would result in the following: 12.3 miles open to highway legal vehicles only, yearlong; 9.8 miles open to all

vehicles, yearlong; and 6.8 miles open seasonally to highway legal vehicles. Once implemented, these changes would be reflected on the next published MVUM.

The ORD of the project area would increase to 1.53 mi/mi².

Cumulative Effects

There are no other past, present or reasonably foreseeable changes to the transportation system that would result in additional effects.

Soils

Current Conditions

Soil maps and mapping unit descriptions and interpretations are based upon the fact that different soil types result from different combinations of geology, geomorphology, topography, vegetation and climate which influence land use activities, capabilities, and various interpretations for management. The nature, patterns and extent of these soils give each mapping unit its own set of interpretations for use and management. There are 17 soil mapping units within the project area.

Wetlands and Floodplains - Soil mapping units, which are subject to flooding (indicated in the unit name) and/or as having hydric soils as a major component, require special management considerations and evaluations so that proposed actions will not adversely alter the natural values of these areas. Soil mapping units 54, 55, 60, 142 delineate areas that contain floodplains and possibly other areas that have a risk of flooding. These units give an approximate determination of areas in which the probability of flooding in any given year is at least 1 percent at higher elevations and increases as elevation decreases within the mapping unit.

Direct and Indirect Effects

No Action

Erosion - Only the undisturbed natural erosion would be expected to continue.

Compaction and Displacement - This alternative would result in no additional compaction or displacement as no heavy equipment use is planned.

Nutrient Loss - This alternative would result in no direct nutrient loss.

Proposed Action and No Herbicide

Compaction - Compaction increases soil bulk density and decreases porosity as a result of the application of forces such as weight and vibration. Compaction can detrimentally impact

both soil productivity and watershed condition by causing increased overland flow during storm events and reduced plant growth due to a combination of factors including reduced amounts of water entering the soil and its reduced availability to plant growth, a restricted root zone, and reduced soil aeration. It is generally acknowledged that all soils are susceptible to soil compaction or decrease soil porosity. The soils in this planning area are most susceptible to compaction when wet.

For this analysis area: there are soils with a severe compaction rating in which equipment operation should be limited to July through November. There are also soils with a high or moderate-high compaction hazard rating in which equipment operation should be limited to April through November. Even during these drier periods, extra care would be taken to monitor soil conditions and suspend operations when soils become wet. Given this mitigation, soil compaction would be limited and is not expected to impair soil productivity. See Chapter 2, technical requirements.

Fire - Any long-term negative effects to the soil would be related to high severity burns or very short (less than three years) frequency of the burns. Typical burn severity would be limited by established burning parameters and mitigation measures designed to protect soils and overstory trees and to minimize risk of escape. These parameters result in retention of enough leaf litter to protect soil from the negative effects listed above in most cases. Proposed burn areas would be burned as needed to reach a natural fire regime in this area. The prescribed burn frequency would be based on the current fuel loads, the priority of the unit and reasonable accessibility to achieve the desired condition. These are also considered when determining timing or season and intensity of the prescribed burn.

Cumulative Effects

No Action

There are no cumulative effects since no other activities will occur in the vicinity at the same time.

Proposed Action and No Herbicide

Effects from past actions are no longer impacting the soil resource. There are no present actions impacting the soil resource. There is always the potential for a wind or insect/disease event that would result in salvage or sanitation harvests within the same areas proposed for harvest under this project. Because salvage or sanitation harvests in response to these natural events would also follow the Revised Forest Plan guidance designed to protect the soil resource, any additive effect would be minimal.

Water Quality

Current Conditions

The project area is incorporated by 1 12-digit HUC sixth-level subwatershed with a low initial risk level, Upper North Fork Saline River – (80402030101)

Direct and Indirect Effects

No Action

Proposed soil disturbing activities resulting in stream sedimentation would not occur.

Proposed Action

Direct effects of management activities would result from logging equipment and vehicles traversing stream crossings, fireline and road construction through streams, etc. These activities could place pollutants directly into a watercourse. While it is impractical to eliminate all soil from entering a stream, it is possible to limit the amount that directly enters streams by designing and implementing BMPs found within the RLRMP and Arkansas Forester's BMPs. When herbicides are transported, mixed, and applied, there is a risk that the herbicide could be spilled. Herbicides may enter streams, ponds, and lakes during treatment by direct application or drift.

Indirect effects to water quality are those occurring at a later time or distance from the triggering management activity. Indirect effects are from management activities that do not have a direct connection to a stream course.

Timber harvest and fire can increase nutrients released to streams, with potentially positive or negative effects. Research studies in the Ouachita Mountains have shown increases in concentrations of some nutrients following timber harvest, but increases are generally small and short-lived, particularly where partial harvests are implemented (Oklahoma Cooperative Extension Service, 1994). Small increases in nutrient concentrations may have a beneficial effect on these typically nutrient-poor stream systems. Van Lear and others (1985) examined soil and nutrient export in ephemeral streamflow after three low-intensity prescribed fires prior to harvest in the Upper Piedmont of South Carolina. Minor increases in stormflow and sediment concentrations in the water were identified after low-intensity prescribed fires. It was suggested that erosion and sedimentation from plowed fire lines accounted for the majority of sediment from all watersheds.

Road maintenance and/or construction, fireline construction and reconstruction and timber management activities such as construction of skid trails, temporary roads and log landings could result in increases in erosion and sedimentation. Roads contribute more sediment to streams than any other land management practice (Lugo & Gucinski, 2000). Increases in water yield are generally proportional to decreases in vegetative cover. Because vegetative cover would to some extent decrease, water yield increases are expected to be minor (Oklahoma Cooperative Extension Service, 1994). Stream channels in the area are capable of withstanding small increases in flow.

Forest monitoring has demonstrated that indirect effects from vegetation manipulation from harvest or stand improvement with buffers did not have a significant effect on water quality (Clingenpeel, 1989). Beasley et al. (1987) showed a statistically significant increase in

nutrient concentrations of orthophosphorus, potassium and calcium for only the first year after clearcutting. There was no effect from selection harvesting. Because of the short period of increases (one year) and the dilution of untreated areas, there was no meaningful impact to water quality.

The Proposed Action includes the use of the herbicides triclopyr-amine, triclopyr-ester, imazapyr, and glyphosate for site preparation and release. When herbicides are applied, there is a risk that the chemical could move offsite, possibly entering streams, ponds, lakes, or infiltrate ground water by vertical seepage into aquifers. The Forest Service has specific regulations for the use and application of herbicides, and the ONF adheres to additional design criteria for herbicide application in the RLRMP. When all BMPs or regulations are implemented, there should be little movement of herbicide offsite. The introduction of herbicides into the water is treated as an indirect effect since standards and guidelines (BMPs) do not permit direct application for silvicultural purposes. Herbicide monitoring across the Forest has found that only trace amounts of herbicide have ever been detected in streams (Clingenpeel, 1993).

Herbicide applications were monitored for effectiveness in protecting water quality over a five-year period on the ONF (Clingenpeel, 1993). The objective was to determine if herbicides are present in water in high enough quantities to pose a threat to human health or aquatic organisms. From 1989 through 1993, 168 sites and 348 water samples were analyzed for the presence of herbicides. The application of triclopyr-amine, triclopyr-ester, imazapyr, and glyphosate for site preparation and release was included in the analysis. Of those samples, 69 had detectable levels of herbicide. No concentrations were detected that would pose a meaningful threat to beneficial uses. Based on this evaluation, the BMPs used in the transportation, mixing, application and disposal are effective at protecting beneficial uses. Based on the results of these research and monitoring efforts and the mandatory implementation of BMP's an adverse direct or indirect effect resulting from these proposed management actions is unlikely.

No Herbicide

The effects of management activities would be the same as those described above except the listed effects from herbicide would not occur.

Cumulative Effects

Proposed Action, No Herbicide and No Action

The Aquatic Cumulative Effects (ACE) model was used to determine the watershed condition of the 12-digit HUC sixth-level subwatersheds, as well as assess proposed project impacts. Watershed Condition Ranking (WCR) is a risk ranking integrated in the model that returns a High, Moderate, or Low ranking based on predicted sediment delivery to streams and effects on fish community diversity and abundance. The primary variables driving ACE, and subsequently the WCR, are road density, urban areas, pasture lands and project treatments.

Local research has shown that the effects of increased sediment as a result of timber harvests are identifiable for up to 3 years (Beasley, Miller, & Lawson, 1987). The timeframe of this model is bound by three years prior and one year following implementation. This captures the effects of other management activities that may still affect the project area. This is consistent with most project level environmental analyses that have an operability of five years. Proposed actions are constrained to a single year. This expresses the maximum possible effect that could occur. Past activities that have a lasting effect (such as roads and changes in land use) are captured by modeling the sediment increase from an undisturbed condition. The predicted sediment delivery and risk levels for the subwatersheds are displayed in the table below.

Sediment Delivery By Alternative (Table 3.2)

Subwatershed <i>6th level HUC ID#</i>	Alternative	Sediment Delivery		Risk Level
		Tons Per Year	% Increase*	
Upper North Fork Saline River 80402030101	<i>Current Condition</i>	3,450	NA	Low
	No Action	140	NA	Low
	Proposed Action & No Herbicide	1,446	37%	Moderate

*Percent increase over sediment delivery from undisturbed watershed condition

Upper North Fork Saline River (80402030101)

Moderate -- environmental effects are measurable and observable for short periods of time following storm flow events. These effects are short term (less than a few weeks) and do not affect large portions of the watershed. Recovery is complete and beneficial uses are disrupted only for short periods in localized areas. Monitoring of aquatic biota is recommended to determine the severity of adverse effects. In addition to the application of forest standards and BMPs, monitoring may be necessary.

Vegetation

Current Conditions

Based on recent forest inventories, the current acreage of the various age classes and the percentage of the project area they comprise are tabulated by forest type in the table below. This distribution is only forested land.

Current Age Class Distribution by Forest Type (Table 3.3)

Age Class (years)	Forest Type					
	Pine	Pine- Hardwood	Hardwood- Pine	Hardwood	Total	
					Acres	Percent
0-10	494	0	0	0	494	3.37%
11-20	203	37	0	0	240	1.64%
21-30	283	0	0	0	283	1.93%
31-40	1509	0	0	0	1509	10.28%
41-50	1037	0	0	0	1037	7.06%
51-60	59	48	0	0	107	0.73%
61-70	270	292	0	15	577	3.93%
71-80	1443	898	183	14	2538	17.29%
81-90	1376	1029	279	135	2819	19.21%
91-100	1295	698	1040	825	3858	26.28%
101+	453	251	260	252	1216	8.28%
Total	Acres	8422	3253	1762	1241	14,678
	%	57.38%	22.16%	12.00%	8.45%	100%

Early Seral Conditions (Revised Forest Plan, WF001) - There are approximately 494 acres of early seral stage habitat (0-10 year age class) in the pine/pine hardwood forest types including acquired land. Existing early seral condition comprises approximately 3.37% of the total project acres.

Mature Growth (Revised Forest Plan, WF006) - There are approximately 5102 acres of pine and pine hardwood mature-growth (80 plus years of age), totaling nearly 43.7% of the total pine/pine-hardwood forest type. There are 511 acres of hardwood and hardwood-pine mature-growth (100 plus years of age), totaling 17.2% of this forest type.

Retention and Recruitment of Hardwoods - There are approximately 3003 acres of hardwood and hardwood-pine forest type representing 20.45% of the timber resource within the project area. These forest types would be managed for retention (leave) and recruitment (addition) of hardwoods.

Hardwood Mast Production (Revised Forest Plan, WF003) - There are approximately 3003 acres of 50+ year old hardwood and hardwood-pine stands totaling 20.45% of the hardwood timber resource within the project area.

Stand Vigor and Health - Trees in most of the pine stands are crowded or densely stocked. This condition results in stress, reduced vigor and health, and increased susceptibility to

insects and diseases. Hardwood stands, especially those near ridgelines, are stressed from periodic drought and are also overstocked resulting in reduced vigor and health with increasing susceptibility to infestations by insects such as the red oak borer *Enaphalodes rufulus*.

Direct and Indirect Effects

No Action

In the absence of natural disturbance, through time the current age classes would retain the same distribution in relation to one another, but the distribution would be increasingly skewed to the older age classes. The forest would continue to age, moving more pine and hardwood acreage into mature growth. In the absence of fire or other vegetation management activity, trees would grow in and grow up and shade out shrubs, forbs and grasses and reduce their quantities. In the absence of thinning and regeneration harvests, forest health would be at risk due to increased potential for pest infestations such as the southern pine beetle. Forest health and stand vigor would continue to decline.

Proposed Action

The table below details the age class distribution of the project area after implementation of harvest activities. Age class distributions are shown for pine types and for all forested land (total of all forest types).

Post-Harvest Age Class Distribution Pine Types (Table 3.4)

Age Class (years)	Forest Type					
	Pine	Pine- Hardwood	Hardwood- Pine	Hardwood	Total	
					Acres	Percent
0-10	987	0	0	0	987	6.72%
11-20	494	37	0	0	531	3.62%
21-30	203	0	0	0	203	1.38%
31-40	283	0	0	0	283	1.93%
41-50	1368	0	0	0	1368	9.32%
51-60	815	48	0	0	863	5.88%
61-70	59	292	0	15	366	2.49%
71-80	270	898	183	14	1365	9.30%
81-90	1294	1029	279	135	2737	18.65%
91-100	1156	698	1040	825	3719	25.34%
101+	1493	251	260	252	2256	15.37%
Total	Acres	8422	3253	1762	1241	14,678
	%	57.38%	22.16%	12.00%	8.45%	100%

The 0-10 year age class would increase to approximately 8.5% of pine/pine hardwood types and 6.7% of all land after even-aged regeneration harvests. Mature growth pine/pine hardwood (80 plus years of age) would decrease by approximately 8.5% of the pine/pine hardwood types. There would be no change to mature growth hardwood/hardwood pine forest types (100 years plus age). Diseased, damaged and suppressed trees would be removed through commercial thinning activities on approximately 2,349 acres of pine stands. By reducing stand densities through thinning, stand vigor would improve. During the regeneration of pine stands, the hardwood sprout/seedling component objective is 10 to 30 percent of stems in hardwoods, primarily oaks and hickories (RLRMP, FR003, p.80). Hardwoods would be removed in pine regeneration harvest areas through subsequent seedling release treatments; however a minimum of 10 percent hardwood would be retained or maintained through the life of the stand where possible. Recruitment of hardwoods within these stands could also be impeded by these activities. Within the stands proposed for midstory reduction, selected suppressed and intermediate trees would be released from competition, thus increasing mast production on released trees.

Ground-disturbing activities such as timber harvest, mechanical site prep, road construction, road maintenance, fireline construction, and fireline maintenance, could increase the population and spread of non-native invasive species by destroying individual stems which would result in prolific sprouting. They would also provide seedbeds for NNIS germination. Mechanical equipment could also dislodge seeds and transport them to unaffected areas.

Implementation of Best Management Practices would reduce the possibility of introducing or spreading non-native invasive plants during project implementation.

No Herbicide

The effects of this alternative would be the same as those listed for the Proposed Action except only manual or mechanical methods would be used in vegetation management activities. Site preparation and release activities would be less successful, making stand establishment more difficult.

Cumulative Effects

No Action

In the absence of natural disturbance, through time the current age classes would retain the same distribution in relation to one another, but the distribution would be increasingly skewed to the older age classes. The forest would continue to age, moving more pine and hardwood acreage into mature growth. In the absence of fire or other vegetation management activity, trees would grow in and grow up and shade out shrubs, forbs and grasses and reduce their quantities. In the absence of thinning and regeneration harvests, forest health would be at risk due to increased potential for pest infestations such as the southern pine beetle. Forest health and stand vigor would continue to decline.

Proposed Action and No Herbicide

There are no other past, present, and reasonably foreseen future actions. Implementation of this project would reduce mature forest by 987 acres, an 8.5% reduction. This loss of mature forest would be offset each year by the acres moving into mature forest conditions.

Proposed, Endangered, Threatened and Sensitive Species (PETS)

Current Conditions

PETS Species Considered & Evaluated

The PETS species checklist contains federally listed endangered, threatened, and proposed species and sensitive species that are known to occur on the Ouachita National Forest (ONF) and is comprised of sensitive species from the Forest Service Region 8 Revised Regional Forester's Sensitive Species (RFSS) list (USDA Forest Service 2018). Of these 80 PETS species, there are 16 plants and animals federally designated by the FWS as; proposed (0 species), endangered (10 species), or threatened (6 species). In addition, the RFSS lists is composed of 63 species of plants (32) and animals (32) known to occur or that may occur on the ONF lands and for which there is a viability concern.

All 80 PETS species were considered. The FWS list of Endangered and Threatened Wildlife and Plants, ANHC inventories of PETS species (2007, 2018, 2019), and Forest and District

records were all examined for potential PETS species locations. Of these, the North Fork Saline River Biological Evaluation (BE) reviewed 21 species in detail as being within or potentially within the proposed analysis areas. Detailed descriptions of these PETS species, their habitats, and a discussion of the effects of the proposed actions on each are included in the BE. The information below addresses direct, indirect, and cumulative effects of all alternatives on the selected PETS species as those species occurring or potentially occurring in the analysis area. No direct, indirect, or cumulative effects would occur to the other PETS species listed in the BE and therefore are excluded from further discussion.

The analysis of effects discussion below is separated and organized as follows. 1) Species will be discussed in the order shown in the table below. 2) Some species are lumped into species groups when the effects on each are similar. 3) Each species, or group of species, is discussed by alternative. 4) For each alternative, direct, indirect, and cumulative effects on each species or group of species is discussed.

Potentially Affected Species (Table 3.5)

Group	Common Name	Scientific Name	Status *
Mammal	Northern Long-eared bat	<i>Myotis septentrionalis</i>	Threatened
Mammal	Tricoloured bat	<i>Perimyotis subflavus</i>	Sensitive
Mussel	Arkansas fatmucket	<i>Lampsilis powellii</i>	Threatened
Mussel	Elktoe	<i>Alasmidonta marginata</i>	Sensitive
Mussel	Purple lilliput	<i>Toxolasma lividum</i>	Sensitive
Mussel	Pyramid pigtoe	<i>Pleurobema rubrum</i>	Sensitive
Mussel	Southern hickorynut	<i>Obovaria arkansasensis</i>	Sensitive
Mussel	Western Fanshell	<i>Cyprogenia aberti</i>	Sensitive
Fish	Kiamichi Shiner	<i>Notropis ortenburgeri</i>	Sensitive
Fish	Longnose darter	<i>Percina nasuta</i>	Sensitive
Fish	Ouachita Madtom	<i>Notropis lachneri</i>	Sensitive
Fish	Peppered Shiner	<i>Notropis perpallidus</i>	Sensitive
Fish	Stargazing Darter	<i>Percina uranidea</i>	Sensitive
Bird	Bachman's Sparrow	<i>Peucaea aestivalis</i>	Sensitive
Insect	Monarch butterfly	<i>Danaus plexippus</i>	Sensitive
Insect	Frosted Elfin	<i>Callophrys irus</i>	Sensitive
Vascular Plant	Kentucky Lady's slipper	<i>Cypripedium kentuckiense</i>	Sensitive
Vascular Plant	Nuttall's cornsalad	<i>Valerianella nuttallii</i>	Sensitive
Vascular Plant	Openground draba	<i>Draba aprica</i>	Sensitive
Vascular Plant	Ouachita false indigo	<i>Amorpha ouachitensis</i>	Sensitive
Vascular Plant	Ozark chinquapin	<i>Castanea pumila ozarkensis</i>	Sensitive

* Sensitive: USDA-Forest Service Designation

Northern long-eared Bat-Threatened

Direct & Indirect Effects

No direct effects from any of the alternatives would occur to wintering northern long-eared bats as no winter hibernacula exists in the analysis area and the closest known hibernaculum is approximately 25 miles southwest from the project area and no suitable mine habitat is within the project area.

No Action

The No Action alternative would have no direct effects on NLEBs. The retention of existing pine and hardwood forested conditions without human-caused disturbance would continue to offer roosting and nesting habitat. Diversity of foraging conditions would decline as succession continued. Without the creation of early successional habitat, insect diversity and abundance would likely decline, resulting in a loss of foraging opportunities for the NLEB.

Proposed Action

Timber, Silvicultural & Wildlife Activities

Unknown roosting and/or maternity sites could potentially be felled or damaged by falling trees. If a maternity tree is felled, young non-volant pups could be killed. However, direct effects are not expected or would be minimal because there are no known roost trees or maternity trees in the planning area.

Cutting trees for the various proposed timber treatments may result in death and injury to bats and their young during the maternity period, when pups are non-volant (Wisconsin DNR 2013), and may also disrupt roosting and maternity behavior. Adult NLEBs are highly mobile and are capable of fleeing to avoid danger; therefore, there should be no direct effects on adult's bats during the active season (volant season).

The habitat of NLEB may be impacted indirectly by noises associated with timber, silvicultural, and wildlife activities, such as the sound of saws and/or general human interaction (USDI FWS 2013a). Further, potential indirect effects to the NLEB may include disturbance and/or temporary habitat degradation from the cutting activities associated with the proposed action. Conversely, the resulting canopy and midstory openings will increase the amount of sunlight to the forest floor, resulting in a diverse and abundant assemblage of vegetation, which will increase the general biodiversity of the insects the NLEB forages upon. Additionally, the reduced clutter and lower basal area associated with the proposed activities will result in improved habitat for NLEBs, and will also increase the small openings preferred for foraging (Lacki and Schwierjohann 2001, Perry and Thill 2007, Perry et al. 2007, Perry et al. 2008).

Prescribed Fire

Prescribed burns may occur during the dormant season or during the growing season. For dormant season burns, NLEBs are generally found in hibernacula such as caves and mines. For growing season burns, NLEBs may be displaced from existing roosts due to smoke intrusion and human disturbance. However, NLEBs switch roost trees every 2-4 days and are capable of escaping danger, so direct effects are unlikely. However, if burns occur during the lactation period, mortality may occur in non-volant young, which are incapable of escaping burn areas (Perry 2011). Smoke from the prescribed fires could potentially cause arousal of roosting bats, however direct injury and mortality from summer prescribed fire is suggested to be generally low (Carter et al. 2002).

NLEBs have been hypothesized to be a fire-adapted species (Lacki et al. 2009). Prescribed burning creates stands with less understory growth, more open areas, and generally more snags. These are all conditions preferred by NLEBs in southeastern forests (Perry 2011). In fact, in multiple studies (e.g. Perry and Thill 2007, Perry et al. 2007, Lacki et al. 2009), NLEBs were found more commonly in stands on a frequent (approximately every 3 years) burn rotation. In addition to creating habitat more favorable to NLEBs, prescribed burns create better foraging habitat with a more abundant and diverse prey base (Perry 2011). A regular prescribed burning rotation in addition to the other management activities proposed will improve roosting and foraging habitat for NLEBs on the ONF. In addition to maintaining the habitat required by NLEBs for roosting, these management activities will maintain areas preferred by female NLEBs for maternity roosts (Perry et al. 2007). Prescribed burning activities may improve habitat for the insect prey base of NLEBs by maintaining an open understory predominated by native vegetation. Smoke intrusion into hibernacula has the potential to rouse bats from hibernation, though mortality is unlikely (Perry 2011). Consequently, repeat burning could potentially create forest stands with abundant hollow trees. Trees located near down logs, snags, or slash may be more susceptible to damage or death, and aggregations of these fuels can create clusters of damaged trees or snags (Brose and Van Lear 1999, Smith and Sutherland 2006).

Herbicide Application

The following herbicide active ingredients have been proposed for the control of vegetation: glyphosate, imazapyr and triclopyr. Since no risk assessment studies have been conducted specific to the NLEB, we used the rats as an analog. Specific information on all herbicides proposed for use in the project area is available from SERA (SERA) (www.sera-inc.com/).

Summary of LD50 Values for Each Proposed Herbicide Active Ingredient

Active Ingredient	LD₅₀*	Toxicity Risk to Rat	Risk Assessment
Glyphosate	>5000mg/kg of body weight	Relatively non-toxic	Syracuse Environmental Research Associates, Inc. 2011
Imazapyr	>5000mg/kg of body weight	Relatively non-toxic	Syracuse Environmental Research Associates, Inc. 2011
Triclopyr	>1000 mg/kg to 2055 mg/kg of body weight	Relatively non-toxic	Syracuse Environmental Research Associates, Inc. 2011

LD₅₀* - lethal dose for 50% of population tested; bw – body weight; kg – kilogram; mg – milligram

Acute oral and dietary studies of the listed chemicals exhibit a range in analysis toxicity from practically nontoxic to slight toxicity to rats. These determinations were based on concentrations of herbicides in rat diets that would in all cases far exceed concentrations in field treatment applications.

Due to the NLEB's emergence times, it is highly unlikely that individuals themselves will come into direct contact with herbicide or recently sprayed vegetation. By dusk, herbicides should be dried on the substrate on which they were sprayed (Lacki et al. 2007). Mechanical methods of removal are not expected to have direct effects as snags are not a target for mechanical removal.

There is a possibility that NLEBs could consume insects that have been contaminated or sickened by the herbicide treatments. Herbicides would be applied at the lowest effective rate in meeting project objectives in an attempt to reduce any potential negative effects to the environment. All label instructions and Forest Plan standards and guidelines will be followed. Herbicide application will allow an increase in native vegetation, resulting in the overall enhancement of wildlife habitat (Guynn et al. 2004). In studies conducted in the southeastern United States, herbicide application combined with a regular prescribed burn rotation restored forests to their native overstory pine/understory grass communities, producing the habitat type NLEBs prefer in this region (Guynn et al. 2004, Perry and Thill 2007, Perry et al. 2007, Lacki et al. 2009).

Transportation System and Fire line Construction

The effects from road work and fire line construction and maintenance will be similar to those addressed in the timber section, since these activities involve the removal of trees and soil disturbance.

Pond Construction and Maintenance/Reconstruction

Wildlife ponds play an important role in the foraging ecology of woodland bat species. Many bat species take advantage of wildlife ponds for drinking and foraging since openings often support a high concentration of insects and a rich diversity of insect populations. The uncluttered flying space provided by openings allows bats to freely maneuver, find and catch insect prey and expend less energy than they normally would in a more heavily forested habitat.

Ponds provide important ecological niche habitats essential to certain species of amphibians, birds, reptiles and insects as well as mammals like bats. Wildlife ponds often support hydrophytic (water dependent plant species) vegetation not found in riparian systems which in turn supports a whole host of aquatic insect species also not found in streams and river systems. This diversity of vegetation and associated insect populations would provide excellent foraging habitats for bats.

The direct and indirect effects of rehabilitating or constructing the existing ponds would be similar to those for timber harvest and non-native invasive treatments.

Wildlife Opening Construction & Glade Restoration

Wildlife openings also play an important role in the foraging ecology of woodland bat species. Many bat species take advantage of wildlife openings for foraging space since openings often support a high concentration of insects and a rich diversity of insect populations. The uncluttered flying space provided by openings allows bats to freely maneuver, find and catch insect prey and expend less energy than they normally would in a more heavily forested habitat.

The direct and indirect effects would be the same as those determined for timber management.

Wildlife Opening Decommission

No direct effects would occur because these areas are currently open maintained wildlife openings. Indirect effects would occur from areas naturally re-vegetating from grasses to trees over time and would eventually restrict flight paths and have a decrease in insect populations for foraging but is expected to be minimal due to the small area of impact.

Recreational Trailhead Parking Construction

The direct and indirect effects would be the same as those determined for timber management.

No Herbicide

The No Herbicide alternative would have no direct or indirect effects as a result of deferred herbicide use. However, effects from mechanical/non-herbicide treatments would be the same as in Proposed Action alternative.

Cumulative Effects

No Action

No Action would result in natural succession of early seral habitats into mature forest. This process could result in an overall decline of foraging habitat and open midstory for ease of movement. Without the continued presence of a diversity of seral habitats these PETS bat populations could be affected. There are no known reasonably foreseeable future activities expected to occur on private, state and city lands, therefore, no cumulative effects are expected to occur.

Proposed Action & No Herbicide

No cumulative effects are anticipated from the proposed action. Proposed timber management activities are anticipated to have an overall positive effect for the NLEB by improving and maintaining roosting and foraging habitat. There are no known reasonably foreseeable future activities expected to occur on private, state and city lands which currently has a land use within the watershed analysis area of approximately 84 percent forest, >10 percent pasture and >5 percent urban and is expected to remain constant.

Tricoloured Bat-Sensitive

Direct & Indirect & Cumulative Effects

All Alternatives

Direct, indirect and cumulative effects would be similar to the NLEB.

Proposed, Endangered, Threatened and Sensitive Mussel and Fish species

The Arkansas Department of Environmental Quality (ADEQ) has designated the four forks (Alum Fork, Middle Fork, North Fork, and South Fork) of the Saline River as an ecologically sensitive waterbody (beneficial use, identifies segments known to provide habitat within the existing range of threatened, endangered or endemic species of aquatic or semi-aquatic life forms. - Ouachita Madtom and Arkansas fatmucket) and an extraordinary resource waterbody (beneficial use is a combination of the chemical, physical and biological characteristics of a waterbody and its watershed which is characterized by scenic beauty, aesthetics, scientific values, broad scope recreation potential and intangible social values) (APCEC 2019). Also, the headwaters of the North Fork Saline River lies within the project area and MA20 (Wild and Scenic River Corridors and Eligible Wild and River Corridors), within the project area, consist of that area which includes a ¼ mile distance on each side of

North Fork Saline Project

the North Fork Saline River (USDA Forest Service 2005). All proposed activities in MA20 would maintain or enhance the Outstanding Remarkable Values (ORV) of the proposed designation for the River, in this case, fisheries.

Mussel Species

Arkansas fatmucket - Threatened

Elktoe - Sensitive

Purple lilliput - Sensitive

Pyramid pigtoe – Sensitive

Southern hickorynut - Sensitive

Western Fanshell - Sensitive

Sensitive Fish species

Kiamichi Shiner

Longnose Darter

Ouachita Madtom

Peppered Shiner

Stargazing Darter

Direct & Indirect Effects

No Action

Aquatic habitats are protected under all alternatives by management standards in the Revised Forest Plan. The No Action alternative would have no direct effects on PETS fish species. Indirect effects would continue to contribute sediments to streams from stream crossings, roads needing reconstruction and potential barriers to aquatic organism passage.

Proposed Action

Timber, Silvicultural & Wildlife Activities

No direct or indirect effects from proposed treatments are anticipated to these PETS fish or mussels species. The proposed actions will cause no impacts because the application of provisions within MA9 (Water and Riparian Communities), Forest-wide Normal Timber Harvesting Operating Standard TH001, and Transportation Standards TR003 and TR008 will provide for protection of water quality and protection of SMA Communities (USDA Forest Service 2005a).

Although, direct and indirect effects could occur from associated activities such as, temporary road construction, skid trails, log landings and road reconstruction activities which may cause increased erosion and sedimentation. These effects would occur mainly at and adjacent to stream crossing.

Direct and indirect impacts could occur by individuals being crushed or by potentially impacting water quality from removal of vegetative cover and soil disturbance as roads and skid trails are constructed temporarily concentrating runoff and increasing sedimentation into

streams. Effects are anticipated to be limited due to implementing Revised Forest Plan standards and guidelines.

Prescribed Fire

There will be no direct effects anticipated to these PETS fish or mussels species as a result of the proposed prescribed fire activities. The proposed actions will cause no impacts because the application of provisions within MA9 (Water and Riparian Communities), Forest-wide Normal Timber Harvesting Operating Standard TH001, and Transportation Standards TR003 and TR008 will provide for protection of water quality and protection of SMA Communities (USDA Forest Service 2005a).

Effects from prescribed fire would vary due to fire intensity, aspect, and slope and it would be expected that some degree of forest floor cover would be removed resulting in a more open canopy and reduced vegetative competition, potentially changing dynamics of the streams such as, increasing water temperatures, but these effects would be expected to occur within a mosaic pattern along stream(s) and not occur predominately along the entire stream(s).

Herbicide Application

The following herbicide active ingredients have been proposed for site preparation, release, silvicultural timber stand improvement, pre-commercial thinning and Wildlife Habitat Improvement. The following herbicide active ingredients have been proposed for the control glyphosate, imazapyr, and triclopyr. Since no risk assessment studies have been conducted specific to mussel species, or the above PETS fish species, we used bluegill (*Lepomis macrochirus*) as an analog. Specific information on all herbicides proposed for use in the project area is available from SERA (www.sera-inc.com/).

Summary of LD₅₀ Values for Each Proposed Herbicide Active Ingredient

<u>Active Ingredient</u>	<u>LC₅₀*</u>	<u>Toxicity Risk to Bluegill</u>	<u>Risk Assessment</u>
Glyphosate	70-170 mg/L	<i>Practically Nontoxic</i>	Syracuse Environmental Research Associates, Inc. 2011a
Imazapyr	>100 mg/L	<i>Practically Nontoxic</i>	Syracuse Environmental Research Associates, Inc. 2011b
Triclopyr	Varies greatly with formulation	<i>Appears to be somewhat toxic with great variation</i>	Syracuse Environmental Research Associates, Inc. 2011d

LC₅₀*- lethal concentration for 50% of population tested; L – liter; mg – milligram; ppm – parts per million

There are no direct effects anticipated to these PETS fish or mussels species from herbicide application. Herbicide application methods, including direct application to target foliage or to freshly cut stumps/surfaces, would minimize the possibility of direct contamination to non-target species. Fish should not be affected by herbicide treatments because: 1) the use of herbicides will not occur when weather conditions exceed the threshold for use that could cause drift (HU015, Table 3.8, pp. 88-89) and 2) No herbicide mixing, loading, or cleaning areas will occur within a 300-foot buffer of open water, source waters (public water supply), wells, or other sensitive areas.

There are no indirect effects anticipated to these PETS fish or mussel species, nor their habitats from the application of glyphosate, triclopyr or imazapyr in upland terrestrial habitats. Treated vegetation will be exposed to rainfall and ultra-violet light that assist in rapid degradation of these herbicides (SERA 2011a, b, c). Streamside Management Areas, other vegetated stands and leaf litter will buffer aquatic systems by arresting movement of run-off water and preventing entry of herbicide into the aquatic ecosystem. Herbicides will not be applied to vegetation in SMA within 100 feet of perennial streams such as the North Fork Saline River nor within 30 feet of intermittent stream channels (USDA Forest Service 2005a, p. 103, Table 3.9). Objective HU014 of the Forest Plan states that “soil applied herbicides are not used within 30 feet of undefined channels, nor are they used on soils less than 20 inches deep to bedrock or on other soils with more than 35 percent rock content that are 20-40 inches deep to bedrock. Objective HU011 states that no application will occur within a 300-foot buffer of any source waters without a site-specific analysis (USDA Forest Service 2005a).

The risk characterizations for triclopyr at an application rate of 1lb per acre (proposed rate for the project area) indicate acute and chronic risks to aquatic animals (fish and invertebrates) are low. At the highest application rates considered in testing (10 lbs. per acre), risks to aquatic animals remained substantially below the level of concern and risks to aquatic species are low over the entire range of application rates that may be used in Forest Service programs (SERA 2011a, b, c). Similar findings for imazapyr indicate that available data are sufficient to assert that no adverse effects associated with the toxicity of this product can be anticipated in aquatic animals from the use of this compound in Forest Service programs (SERA 2011a, b, c). The concentrations of any herbicide entering the aquatic ecosystem would be rapidly reduced by the mixing and diluting actions of flowing water. These herbicides are considered to have no cumulative effects on these fish and mussel PETS species (USDA Forest Service 2005c, p. 47; USDI Fish and Wildlife Service 2005a, 2007).

Transportation System and Fire line Construction

Individuals may be impacted by heavy equipment crossing ephemeral streams, though this action is avoided when possible.

Removal of vegetative cover and soil disturbance as roads/fire-lines are established shaped and drainage structures installed would temporarily increase sedimentation, concentrate runoff, and potentially impact water quality, but failure to reconstruct some of these roads and to maintain other roads would have more detrimental impacts than the proposed roadwork. Where possible, fire-line construction and layout would take advantage of natural

and manmade barriers (streams and roads) thus limiting the need to manually construct new lines. Fire-lines crossing intermittent and perennial stream corridors would be constructed using hand tools or back bladed and would be water barred and seeded after construction to limit the potential for sediment runoff. Fire-line construction or re-construction connecting or crossing North Fork Saline River will only use hand line and be at least a minimum of 100 feet, on each side, from the edge of the stream channel. The potential for sedimentation would be reduced by implementing Revised Forest Plan standards and guidelines, MA9 (Water and Riparian Communities), Forest-wide Normal Timber Harvesting Operating Standard TH001, and Transportation Standards TR003 and TR008 will provide for protection of water quality and protection of SMA communities (USDA Forest Service 2005a).

- Additionally, there are approximately 6 miles of proposed road work in MA20. Forest Service road 132c is a seasonally designated open/closed road and is also part of the Northern boundary of the Chinquapin Walk-In Turkey Hunting Area. This road is approximately 4.2 miles in length. Road reconstruction would occur within sections along road 132c where activities such as; clearing brush from the sides of the road, placement of gravel/rock, and installation or replacement of culverts necessary for safety and to maintain the road. Approximately 1 mile of road decommission work and 1 mile of road reconstruction is planned on Forest Service road 809. Obliteration and decommission work along the western section of this road will help protect 2 seep spring areas and restore several small drainages by removing the culverts and restoring the natural contours. Reconstruction work on the eastern section of road 809 would occur along about 1 mile of the road at specific sites such as; culverts that need replaced or installed and placement of gravel or rock. This work may produce short term indirect effects to aquatic PETS species but is expected to benefit these PETS species and also benefit the ORV for MA20, by decreasing stream siltation and sedimentation. Activities for fire-line and road treatments within MA20 will use methods with the least amount of disturbance necessary to meet safety and to help maintain or restore the designated ORVs.

Pond Construction and Maintenance/Reconstruction

Sites do not contain suitable habitats capable of supporting these aquatic PETS species and wildlife ponds within the analysis area meant to provide a source of water and habitat for non-fish species such as amphibians, reptiles, insects and other non-fish species. No direct or indirect impacts to these aquatic PETS species are anticipated.

Wildlife Opening Construction, Decommission, Glade Restoration & Recreational Trailhead Parking Construction

These proposed management actions would not have any direct or indirect impacts on aquatic PETS species since actions would occur outside of habitats preferred by these species and all sites are located outside SMAs and would not contribute to any potential stream impacts.

No Herbicide

The No Herbicide alternative would have no direct or indirect effects as a result of deferred herbicide use. However, effects from mechanical/non-herbicide treatments would be the same as in proposed action alternative.

Cumulative Effects

No Action

Aquatic habitats are protected under all alternatives by management standards in the Revised Forest Plan. The No Action alternative would have no direct effects on PETS mussel and fish species. However, roads would remain open and use would be maintained at current levels. Roads needing closures or repairs would continue to contribute to higher than average sediments and stream crossings creating barriers to aquatic organism passage would remain.

Proposed Action & No Herbicide

Effects from the proposed management activities are anticipated to benefit these PETS species by decreasing stream siltation and sedimentation and improving water quality. No cumulative effects are anticipated from the proposed action due to implementation and application of provisions within MA9 (Water and Riparian Communities), Forest-wide Normal Timber Harvesting Operating Standard TH001, and Transportation Standards TR003 and TR008 will provide for protection of water quality and protection of SMA Communities (USDA Forest Service 2005a). Also, there are no known reasonably foreseeable future activities expected to occur on private, state and city lands which currently has a land use within the watershed analysis area of approximately 84 percent forest, >10 percent pasture and >5 percent urban and is expected to remain constant.

Bachman's Sparrow-Sensitive

Direct & Indirect Effects

No Action

The No Action alternative would have an overall negative effect on the forest-wide population trend for this species by lack of creation of foraging opportunities.

The retention of the overstory without disturbance would have several negative effects on bobwhite. As crowns continued to develop and increase in volume, mast production in the form of acorns would also increase until crown closure and competition for sunlight, moisture, and nutrients limited productivity and stressed trees. Hardwood and pine habitats would become homogeneous with little diversity. Shade-tolerant species such as red maple (no nutritive value to bobwhite) would flourish in the mid and understory with significant root development already established while waiting for the opportunity to occupy the

overstory in tree-fall gaps or when stand replacement events such as wildfire, insect infestation or ice storms occurred. Such replacement would result in loss of hard mast (Zaczek, Groninger, & Van Sambeek, 2002). Other shade tolerant midstory species such as dogwood, serviceberry and farkleberry would provide soft mast, but over time the volume would decline as availability of sunlight decreased with overstory closure. Herbaceous and grassy ground cover would fade and essentially disappear, resulting in loss of brood range and associated seeds and berries and insect and spider populations important to poult growth and development (Dimmick, Gudlin, McKenzie, & Wells, 2004) (Masters & Wilson, Effects of midstory vegetation removal and fire on breeding birds and plant community composition in Red-cockaded woodpecker clusters, 1994) (Fenwood, Urbston, & Harlow, 1984). The additive beneficial impacts of fire, herbicide and road and fire line corridors and associated early seral habitat often used for nesting cover and travel ways would not occur.

Proposed Action

Timber, Silvicultural & Wildlife Activities

Proposed treatments are not likely to directly affect adult birds or nests with eggs or nestlings because timbered stands to be harvested or receive timber and silvicultural treatments do not offer suitable nesting habitat at the time of treatment (Dunning 2006). Adults are highly mobile and if located within a stand to be treated can easily move to another location. Loss of nests, eggs, or nestlings is possible if located within the treatment area. Creation of openings will occur in older stands proposed for harvest or in non-harvested stands too old to provide nesting habitat, resulting in no direct effects.

The reduction of basal areas in treated stands will allow increased light levels to reach the forest floor, increasing suitable nesting and foraging habitat by promoting the growth of grasses and forbs and the production of fruits, seeds and associated insect prey. Peak beneficial vegetative response to regeneration harvest, thinning and follow-up treatments will likely occur 2-4 years post treatment followed by a rapid decline. The magnitude of these beneficial responses will vary by treatment and residual basal areas with greatest benefits from clear cut, seed-tree harvests, and commercial thinning resulting in open conditions, and the least from thinning of younger, denser stands (Blair and Feduccia 1977, Fenwood et al. 1984, Masters et al. 1996, Askins 2000, Masters and Waymire 2000).

The proposed treatments will increase early seral conditions, resulting in improved habitat for BASP. These enhanced conditions generally fade within 5 years, which emphasizes the ephemeral nature of this forest type (Tucker et al. 2006, Cox and Jones 2007, Jones et al. 2013). Because these effects only persist for about one-third of an entry cycle (entry cycle = 10-15 years) similar timber and silvicultural activities on nearby and adjacent public and private lands are key to keeping this seral stage available. However, the proposed action will improve wintering, breeding, and foraging habitat for BASP in the project area for several years helping increase populations on the Forest.

Prescribed Fire

Stands containing suitable nesting habitat (clear cut/seed-tree), are typically not burned once forest regeneration has been established and at a time when grasses and forbs have become dominant forest floor vegetation. Prescribed burns may be conducted in older, thinned stands at any time following harvest. Prescribed fires conducted during the non-nesting season will have no direct effect on adult birds, eggs or nestlings, since individuals are volant and able to escape burn areas. Growing season burns occurring during nesting season could result in the loss of nesting females, eggs and/or nestlings.

The application of prescribed fire will create and maintain the early successional habitat required by BASP (Cox and Jones 2007, Jones et al. 2013). In fact, Jones et al. 2013, found that BASP are dependent on frequent fire regimes and prefer to nest in areas that have burned within the past year. These beneficial effects may be magnified when the application of fire occurs following timber harvest and/or silvicultural/wildlife treatments.

Prescribed fire will occur over most of the project area and is an effective way to introduce and maintain a degree of disturbance in a variety of stand types. Burns will be incremental, with the watershed subdivided into manageable burn units and not burned all within one season. Burning in increments will ensure enhanced habitat conditions are available for an extended period of time and reduce the potential for catastrophic wildfire by creating a mosaic of burned and unburned fuels. The occurrence of wildfire could, depending upon timing, have negative impacts on individuals (Reice 2001). Benefits from prescribed fire are ephemeral and rarely persist on site for more than a few years, which further emphasizes the importance of prescribed fire in adjacent watersheds.

Herbicide Application

The following herbicide active ingredients have been proposed for site preparation, release, silvicultural timber stand improvement, pre-commercial thinning and Wildlife Habitat Improvement: glyphosate, imazapyr and triclopyr. Since no risk assessment studies have been conducted specific to BASP, another species was chosen which has similar natural history, habitat use and habitat needs as the closest analog: Northern Bobwhite. Specific information on all herbicides proposed for use in the project area is available from SERA (www.sera-inc.com/).

Summary of LD50 Values for Each Proposed Herbicide Active Ingredient

<i>Active Ingredient</i>	<i>LD₅₀*</i>	<i>Toxicity Risk to Bobwhite and or Mallard</i>	<i>Risk Assessment</i>
Glyphosate	>2000mg/kg of body weight	U.S. EPA/OPP (1993) classifies glyphosate as no more than <i>slightly toxic</i> to birds	Syracuse Environmental Research Associates, Inc. 2011
Imazapyr	>2150mg/kg of body weight	All acute exposure studies in birds show that metsulfuron methyl has <i>very low toxicity</i>	Syracuse Environmental Research Associates, Inc. 2011
Triclopyr	849mg/kg to 2055 mg/kg of body weight	U.S. EPA/OPP (1998b) has classified triclopyr as being <i>slightly toxic to birds</i>	Syracuse Environmental Research Associates, Inc. 2011

LD₅₀*- lethal dose for 50% of population tested

LC₅₀** - lethal concentration for 50% of population tested

Acute oral and dietary studies of the listed chemicals exhibit a range in analysis toxicity from practically nontoxic to slight toxicity to birds. These determinations were based on concentrations of herbicides in quail diets that would in all cases far exceed concentrations in field treatment applications.

Direct effects of herbicide application on nests with eggs or nestlings are not likely to occur because the primary target of the majority of applications will be hardwood brush located in dense forest stands typically beyond the useful condition for this bird. Neither hardwood brush nor dense stands are preferred nesting habitat for this bird due to a lack of grass and herbaceous plants important for nest construction and concealment. Adults and fledglings are highly mobile and will not be directly impacted.

Herbicide application has the potential to temporarily negatively impact foraging and nesting opportunities in small, specific treatment areas by reducing the availability of seeds from woody plants and broadleaf herbaceous species contacted by herbicide. Treatment of individual targeted plants will reduce the potential impact to non-target, beneficial vegetation. Some but not all of these herbicides affect grasses. However, without using herbicide a monoculture of a particular species may occur, which has little to no benefit to wildlife populations.

Herbicides will extend the life of treatments by inhibiting re-growth and canopy closure of treated species while providing open habitat conditions conducive for native grass and

herbaceous plant growth, which will enhance nesting and foraging habitats. Future entry cycles may also utilize herbicides that will provide similar results, but these events will be separated in time and most likely by space as treatments occur in stands different from those treated this cycle.

Transportation System and Fire line Construction

There will be no direct effect on this bird, eggs or nestlings if road and fire line activities occur outside the nesting period. If old roads provide nesting habitat and are occupied by birds when re-opened and utilized during project implementation, eggs and nestlings may be destroyed but highly mobile adults will not be impacted.

When roads are closed upon completion of management activities and re-vegetated, they may offer ephemeral nesting and foraging habitat. Similarly, if fire line is located adjacent to early forest stage cover habitat it may enhance use by providing disturbed soil and growth opportunities for herbaceous and grassy cover during fire line re-vegetation. In particular with regard to fire line construction, it typically, but not always, occurs as a very narrow band adjacent to larger expanses of unsuitable nesting habitat conditions.

Pond Construction and Maintenance/Reconstruction

Wildlife Opening Construction & Glade Restoration

Wildlife Opening Decommission

Recreational Trailhead Parking Construction

Effects from these proposed management treatments would be similar to those addressed in the timber, road and fire line construction and maintenance sections, since these activities involve the removal of trees and soil disturbance.

No Herbicide

The No Herbicide alternative would have no direct or indirect effects as a result of deferred herbicide use. However, effects from mechanical/non-herbicide treatments would be the same as in Proposed Action alternative.

Cumulative Effects

No Action

This species prefers open and/or cutover areas and the No Action would mean that no new open areas would be created for this species resulting in no creation of early-seral habitats as overstory vegetation becomes established and shades out sub-canopy competition. Natural recruitment of early seral communities would also be limited in that suppression of wildfires and timber insect infestations would still occur. Limited development of early seral habitat in the watershed would only provide minimal habitat for these species.

Proposed Action & No Herbicide

There would be no cumulative effects resulting from any alternative because there are no other past, present, or reasonably foreseeable future actions that would result in additional effects on this PETS species. Proposed actions would be beneficial to this species by creating and maintaining the early seral habitat conditions, which is required for this species.

Monarch butterfly – Sensitive

Direct & Indirect Effects

No Action

The No Action alternative would have no direct effect on Monarch Butterfly. Indirectly, forest health would likely decline due to overstocking of trees. Initially, dense canopy closure could cause a decrease in herbaceous plants needed for nectar food sources and egg-laying sites used by this species. Overstocked forests could promote disease and insect outbreaks, and wildfires which would eventually open the forest canopy. If such openings were created, this would temporarily promote a flush of herbaceous growth which may include high quality nectar producers and violets for egg deposition used by this species. Periodicity and intensity of these events would be unpredictable under this alternative.

Proposed Action

Timber, Silvicultural & Wildlife Activities

Since adult butterflies are highly mobile it is extremely unlikely that they would be directly affected by these proposed management actions. However, there is the possibility of direct effects to eggs and larvae if trees are skidded or equipment impacts larva/eggs on host plants (milkweeds) and nectar producers.

Proposed treatment activities would create some disturbance to the understory vegetation resulting in a temporary loss of some woody shrubs, and annual, and perennial broadleaf herbaceous plant species but, would also allow for increases in new herbaceous plant growth which will revegetate the area providing potential foraging and egg laying habitat suitable for the Monarch butterfly. While some butterfly habitats may be impacted by the treatment activities, maintaining or expanding suitable habitat would be “beneficial” for the species in the long-term.

Prescribed Fire

Females lay eggs haphazardly on the landscape in spring through fall on host plants of milkweed species, with eggs hatching in about 4 days. Direct effects may occur to adult butterflies and eggs or larvae from fire or smoke during summer or fall burns, but is anticipated to be limited because most prescribed fire on the ONF is conducted in the winter.

Each year, the final generation of monarchs, adults that emerge in late summer and early fall (Sept-Oct), has an additional job. They migrate to overwintering grounds, either in central Mexico for eastern monarchs or in California for western monarchs. Here they spend the winter clustered in trees until weather and temperature conditions allow them to return to their breeding grounds. These adults can live up to nine months. Direct effects are not expected during winter burns due to Monarch butterflies overwintering in areas outside the ONF.

The reduction of small diameter woody stems that produce shade and the resulting release of nutrients into the soil from the combustion of woody debris, leaf litter and dead herbaceous materials will enhance herbaceous plant growth. Nectar producing plants used by adult butterflies and violets/milkweeds used by larvae and caterpillars should increase as a result.

The periodic use of fire has been shown to be a beneficial tool in maintaining butterfly habitats and is perhaps the most consistent means of producing and maintaining optimal habitat (Rudolph and Ely 2000, Baltosser 2007). This species appears to be fire-dependent (Rudolph et al. 2006a, b). Fire in combination with timber and silvicultural activities produce additive beneficial effects, especially where early seral forest has previously been created, maintained or enhanced. Similar beneficial impacts of fire to plant/pollinator communities have been documented elsewhere (Potts et al. 2003, Campbell et al. 2007a, and b). The effects of prescribed fire will occur over most of the Project Area during this 10-15 year planning period. Burns will be incremental in nature with the area subdivided into manageable burn units, which are not burned within one season. Burning in increments will ensure enhanced habitat conditions are available for an extended period of time and in a mosaic throughout the Project Area. These benefits will be ephemeral and persist for approximately 5 years or less. A 5-7 year return period has been proposed for the application of fire in these terrestrial communities (USDA Forest Service 2005a), however the fire application interval may be longer due to natural and man-imposed constraints. When applied in increments over time portions of the watershed receiving multiple burns may take on the desirable characteristics of the pine-bluestem community that offers habitat conditions readily used by this butterfly.

Herbicide Application

The following herbicide active ingredients have been proposed for site preparation, release, silvicultural timber stand improvement and pre-commercial thinning. Given the great diversity of species of terrestrial invertebrates, the use of data from a single species (Bee - *Apis mellifera*) for the risk characterization obviously leads to uncertainty in the risk assessment. However, given the lack of scientific studies available this information is applicable and represents the best science resource to date.

Summary of LD₅₀ Values for Each Proposed Herbicide Active Ingredient

Active Ingredient	LD₅₀*	Toxicity Risk to Bee - <i>Apis mellifera</i>	Risk Assessment
Glyphosate	>100 µg/bee	Relatively Nontoxic	Syracuse Environmental Research Associates, Inc. 2011
Imazapyr	>100 µg/bee	Relatively Nontoxic	Syracuse Environmental Research Associates, Inc. 2011
Triclopyr	No LD50 stated	No toxicity risk stated	Syracuse Environmental Research Associates, Inc. 2011

LD₅₀*- lethal dose for 50% of population tested

Bioassay studies of the listed chemicals proposed for use in the Project Area all exhibit very low toxicity to invertebrate species (bees). These determinations were based on concentrations of herbicides applied to bees that would far exceed concentrations applied in field treatment applications.

Given the low risk of toxicity exhibited in invertebrate testing no direct impact to Monarch butterfly is anticipated.

Indirect effect of herbicide application would most likely come in the temporary loss of some woody shrubs, and annual and perennial broadleaf herbaceous plant species that provide shelter and food sources (nectar) for this butterfly species. While some butterfly habitats may be impacted by the treatment activities, maintaining or expanding suitable habitat would be “beneficial” in the long-term.

Transportation System and Fire line Construction

Temporary roads may be constructed at any time during the year. Road and fire line construction will have no direct effect on mobile, adult butterflies but may impact eggs or larva due to their immobility.

Roadbeds and ditch-lines, when closed and re-vegetated, may provide habitat for plant species used by this butterfly, however, the number and density of roads used during project implementation will be kept to a minimum in an effort to move open road density toward the Desired Future Condition of the various Management Areas. Beneficial effects of roads used/closed during resource management activities are minimal because they occupy an insignificant acreage on the landscape. Future road activities will most likely follow a similar pattern with no overall gain in road density through time.

Pond Construction and Maintenance/Reconstruction

The effects from pond construction and maintenance/reconstruction work will be similar to those addressed in the timber, silvicultural and wildlife activities and transportation sections, since these activities involve the removal of trees and soil disturbance.

Pond Construction and Maintenance/Reconstruction & Wildlife Opening Decommission

The effects from pond construction and maintenance/reconstruction work will be similar to those addressed in the timber, silvicultural and wildlife activities and transportation sections, since these activities involve the removal of trees and soil disturbance.

Wildlife Opening Construction & Glade Restoration

Proposed treatments would result in creation of potential suitable foraging and egg laying habitat, with effects being similar to those addressed in the timber, silvicultural and wildlife activities and transportation sections.

Recreational Trailhead Parking Construction

The direct and indirect effects would be the same as those determined for timber management.

No Herbicide

The No Herbicide alternative would have no direct or indirect effects as a result of deferred herbicide use. However, effects from mechanical/non-herbicide treatments would be the same as in Proposed Action alternative.

Cumulative Effects

No Action

Effects would include the natural succession of early seral habitats into mature forest. This process could result in an overall decline of some woody shrubs, and annual and perennial broadleaf herbaceous plant species, that provide shelter and food sources (nectar) for this butterfly species. Without the continued presence of early seral stage habitats Monarch butterfly populations would be expected to decline.

Proposed Action & No Herbicide

Because individuals of this species will occupy the same suitable habitat whether breeding or feeding, throughout their life cycle, any work done within the project area should be beneficial overall. While some butterfly habitats may be impacted by the treatment activities, maintaining or expanding suitable habitat would be beneficial for this species in the long-term. The existence of the Monarch butterfly is not in question and the ONF population will not be imperiled due to the proposed action.

Frosted Elfin – Sensitive

Direct & Indirect Effects

No Action

The No Action alternative would have no direct effect on the Frosted Elfin butterfly. Indirectly, forest health would likely decline due to overstocking of trees. Initially, dense canopy closure could cause a decrease in herbaceous plants needed for nectar food sources and egg-laying sites used by this species. Overstocked forests could promote disease and insect outbreaks, and wildfires which would eventually open the forest canopy. If such openings were created, this would temporarily promote a flush of herbaceous growth which may include high quality nectar producers and indigo or lupine species for egg deposition used by this species. Periodicity and intensity of these events would be unpredictable under this alternative.

Proposed Action

All Proposed Activities, except Prescribed Fire

There is only one known location within the project area on the northern boundary off FS road 132. Potential suitable habitat does exist within the project area. Direct and indirect effects would be similar to the Monarch butterfly.

Prescribed Fire

There is only one known location within the project area off FS road 132 on the northern project boundary. Direct effects may occur to adult butterflies and eggs or larvae by destroying individuals if the prescribed burns are conducted when in egg and/or caterpillar stage on the host plant or on top of the ground and if the severity of the burn consumes the duff. Annually burning the same area can decimate populations but is anticipated to be limited because most prescribed fire on the ONF is conducted in the winter.

The reduction of small diameter woody stems that produce shade and the resulting release of nutrients into the soil from the combustion of woody debris, leaf litter and dead herbaceous materials will enhance herbaceous plant growth. Nectar producing plants used by adult butterflies and host plants such as; violets/milkweeds/indigo used by larvae and caterpillars should increase and as a result.

Fire in combination with timber and silvicultural activities produce additive beneficial effects, especially where early seral forest has previously been created, maintained or enhanced. Similar beneficial impacts of fire to plant/pollinator communities have been documented elsewhere (Potts et al. 2003, Campbell et al. 2007a, and b). The effects of prescribed fire will occur over most of the project area during this 10 to 15 year planning period. Burns will be incremental in nature with the area subdivided into manageable burn units, which are not burned within one season. Burning in increments will ensure enhanced

habitat conditions are available for an extended period of time and in a mosaic throughout the Project Area. These benefits will be ephemeral and persist for approximately 5 years or less. A 5 to 7 year return period has been proposed for the application of fire in these terrestrial communities (USDA-Forest Service

2005a), however the fire application interval may be longer due to natural and man-imposed constraints.

No Herbicide

The No Herbicide alternative would have no direct or indirect effects as a result of deferred herbicide use. However, effects from mechanical/non-herbicide treatments would be the same as in Proposed Action alternative.

Cumulative Effects

No Action

Effects would include the natural succession of early seral habitats into mature forest. This process could result in an overall decline of some woody shrubs, and annual and perennial broadleaf herbaceous plant species, that provide shelter and food sources (nectar) for this butterfly species. Without the continued presence of open woods and shrub type habitats Frosted Elfin butterfly populations would be expected to decline.

Proposed Action & No Herbicide

Because individuals of this species will occupy the same suitable habitat whether breeding or feeding, throughout their life cycle, any work done within the project area should be beneficial overall. While some butterfly habitats may be impacted by the treatment activities, maintaining or expanding suitable habitat would be beneficial for this species in the long-term.

Aquatic & Terrestrial Plants-Sensitive

Sensitive Plant Species of SMA

The following species are all riparian species and will be discussed as a group in sections of this document below.

Kentucky lady's-slipper **Ouachita false indigo**

Direct & Indirect Effects

No Action

No Action would allow natural processes to occur without human intervention. Only natural disturbances would cause changes to these sensitive species and their associated habitats which are at the edges of streams, in seeps, wetland and riparian areas. These changes would

be expected to be within the normal range of habitat fluctuation that occurs naturally and to which these species are adapted. No direct or indirect effects on these sensitive plant species would occur as a result of deferred management.

Proposed Action

Timber, Silvicultural & Wildlife Activities

Timber management treatments are proposed for upland shortleaf pine, pine/hardwood and hardwood stands and these areas only support habitat conditions for these sensitive species within SMA and wetland communities such as; seeps and springs, which are protected by the standards in the Revised Forest Plan. The proposed timber management actions would have no direct or indirect impact on these sensitive plant species.

Prescribed Fire

Effects from prescribed fire would vary due to fire intensity, aspect, and slope and it would be expected that some degree of forest floor cover would be removed. Overall prescribed fire is not likely to directly impact these sensitive plant species due to the wet habitat conditions in which they normally occur and prescribed burning occurring during the plants dormancy. Indirectly, plants may benefit post burn due to reduced competition.

Herbicide Application

Surveys found that proposed sites do not contain suitable habitats capable of supporting these sensitive plant species except at stream crossings and riparian habitats which are protected by the standards in the Revised Forest Plan. No direct or indirect impacts from herbicide application treatments are anticipated.

Transportation System and Fire line Construction

Surveys found that proposed sites do not contain suitable habitats capable of supporting these sensitive plant species except at stream crossings and riparian habitats. Fire lines used for prescribed burning would take advantage of existing natural barriers such as existing roadways and streams and utilizing hand lines and or back blading within SMA limiting the amount of disturbance in preferred habitats. Reconstruction of system roads would occur in previously disturbed areas generally unsuitable to these sensitive plant species due to soil compaction. Direct or indirect effects are not anticipated because of the limited amount of disturbance to preferred habitats.

Pond Construction and Maintenance/Reconstruction, Wildlife Opening Construction, Glade Restoration, & Wildlife Opening Decommission

Since proposed actions would occur outside of habitats preferred by these sensitive plant species no direct or indirect impacts are anticipated.

Recreational Trailhead Parking Construction

The direct and indirect effects would be the same as those determined for timber management.

No Herbicide

The No Herbicide alternative would have no direct or indirect effects as a result of deferred herbicide use. However, effects from mechanical/non-herbicide treatments would be the same as in Proposed Action alternative.

Cumulative Effects

All alternatives

There would be no cumulative effects resulting from any alternative because there are no other past, present, or reasonably foreseeable future actions that would result in additional effects on these PETS plant species.

Sensitive Plants Preferring Moderate Disturbance

The next sensitive plant species receive some natural protection from human disturbance by the diversity of their preferred habitats, as described below. Many of the locations on NF lands are on sites that are outside the normal operating limits and activities. Several of the sites on NF lands are protected from habitat-altering activities by virtue of being within glade and riparian communities, Wilderness Areas, and Research Natural Areas. There are also sites located within areas that have had timber management activities, road and trail construction and in areas that have been burned repeatedly.

These sensitive plant species prefer moderate disturbances to help sustain their populations. Soil disturbances, creation of small blocks of early successional habitat, reduction in competition for water and nutrients from neighboring plants, and exposing bare mineral soil for seed contact are some of the benefits they gain by disturbances such timber management actions.

Ozark chinquapin-Sensitive

Direct & Indirect Effects

No Action

Ozark chinquapin occurs entirely as stump sprouts due to chestnut blight a condition in which it has persisted for decades. Individual plants within the analysis area would be expected to remain stable as long as stumps continue to persist. No direct or indirect effects are anticipated from the No Action alternative.

Proposed Action

Timber, Silvicultural & Wildlife Activities

During timber harvest and related activities individual chinquapins may be physically impacted by felled timber and subsequent removal of forest products (tires, logs being removed) however, field surveys found no new locations of Ozark chinquapin in proposed treatment area. Therefore any direct effects are expected to be minimal.

Proposed treatments will reduce basal area and overstory/midstory tree density. This will potentially enhance growth opportunities, especially when combined with prescribed fire treatments that further reduce competition from small woody stems for light, nutrients, space, and water. Habitat where the Ozark chinquapin is found has improved as a result of similar management activities in the past (USDA Forest Service 2005a). Timber harvests without ground disturbing site preparation activities, such as ripping or roller chopping, are considered viable management methods to enhance sprouting, flowering, and seed production without damaging rootstock (NatureServe 2018).

Herbicide Application

Direct effects to this tree are unlikely due to its rare occurrence in managed timber stands where most applications of herbicide will occur. This tree's physical form is easily recognized allowing avoidance in hardwood stands where mid-story reduction and silvicultural activities will occur. Furthermore, the Forest Plan states under Objective TE008 that "Herbicides will not be applied to Ozark chinquapin, and stems of this species will be individually flagged or otherwise marked in the field by qualified personnel prior to herbicide application within the stand. Use of soil active, mobile herbicides should not be applied where they might move to the root system of this species (USDA Forest Service 2005a, pg. 77). A buffer of 30 feet would be required if trees are found and flagged in an application area if foliar application is used.

This tree responds well to an increased level of light and a reduction in competition for water, space and nutrients when adjacent vegetation is reduced during herbicide or other treatments resulting in similar indirect effects. Use of soil active, mobile herbicides should not be applied where they might move to the root system of this species (USDA Forest Service 2005a, pg. 77).

Prescribed Fire & Glade Restoration

Prescribed fire may cause bole injury or top killing of this species, depending on the tree's location, intensity of fire, and season of burn. In the event of injury or top kill, this tree will readily sprout from a well-developed root system. This species is known to occur in areas with past fire history and is considered a fire-dependent species (USDA Forest Service 2005a, Paillet and Cerny 2012).

The release of nutrients into the soil from the reduction of woody debris, leaf litter and dead herbaceous materials may enhance growth and vigor. The potential removal of competing

small diameter stems and the associated reduction in shade will benefit this tree (NatureServe 2018). The application of prescribed fire following timber harvest and related silvicultural/wildlife activities will further reduce competition for water, nutrients, and light enhancing habitat conditions. Benefits from prescribed fire are ephemeral and rarely persist for more than a few years. Descriptions of occupied habitat as being “thin woods” and “rocky ridge tops” are more than likely found in areas where fire (natural and prescribed) has been a regular, repetitive component of the ecosystem that has reduced competition and allowed this species to persist.

Transportation System and Fire line Construction

Construction of roads and fire lines has the potential to uproot individual trees but are expected to be minimal due to the limited area of disturbance. Existing roadbeds are not likely to harbor this tree because habitat conditions would not be conducive to Ozark chinquapin due to soil compaction.

Transportations systems and fire lines constructed near this species may create openings in the canopy, resulting in a release of nutrients and an increase in the availability of sunlight, improving growing conditions for the Ozark chinquapin. Roads (temporary and permanent) do not occupy a large area on the landscape. Additionally, the likelihood of damage to individuals will be remote due to their rare occurrence in areas suitable for harvest where road construction is most likely to occur. Also, the footprint of fire line on the landscape is small and the likelihood of damage to individuals is remote due to their rare occurrence. When fire lines are initially established in the best possible locations there should be little or no future incremental increase in the acreage occupied because those locations will be used again. When possible and feasible, permanent features such as roads and streams will be employed to reduce disturbance of soils and impacts to this tree.

Pond Construction and Maintenance & Wildlife Opening Construction

Pond construction is a ground disturbing activity that has the potential to uproot individual trees; however, each pond site is ground checked for the presence of the Ozark chinquapin or any other PETS species by a qualified individual. If Ozark chinquapin is found within a proposed pond site, the pond site location will be moved to a location where there are no Ozark chinquapins.

Indirect effects will be minimal, due to the small amount of midstory and overstory canopy removed during pond-building activities. Wildlife ponds would be approximately 1/8 to 1/4 acre in size.

Wildlife Opening Decommission

Botanical field surveys of all proposed sites found no occurrence of Ozark chinquapin. No direct, or indirect impacts to this sensitive plant species are anticipated.

Recreational Trailhead Parking Construction

The direct and indirect effects would be the same as those determined for timber management.

No Herbicide

The No Herbicide alternative would have no direct or indirect effects as a result of deferred herbicide use. However, effects from mechanical/non-herbicide treatments would be the same as in Proposed Action alternative.

Cumulative Effects

All alternatives

Ozark chinquapin occurs entirely as stump sprouts due to chestnut blight a condition in which it has persisted for decades. Individual plants within the analysis area would be expected to remain stable as long as stumps continue persists. There would be no cumulative effects resulting from these alternatives because there are no other past, present, or reasonably foreseeable future actions that would result in additional effects on these PETS plants species.

Sensitive Plant Species of Glades and Similar Habitats

These plant species all prefer glade and similar habitats. These areas are isolated from most management activities due to the provisions of the Revised Forest Plan. They will be discussed as a group in sections of this document below.

Nuttall's Cornsalad

Openground draba

Direct & Indirect Effects

No Action

The No Action alternative would allow natural processes to occur without human intervention. Only natural disturbances would cause changes to these sensitive plant species and their associated glade and similar habitats. These changes would be expected to be within the normal range of habitat fluctuation that occurs naturally and to which these species are adapted. No direct or indirect effects are anticipated on these plant species as a result of deferred management.

Proposed Action

All proposed management activities except for Prescribed Burning & Glade Restoration

The Revised Forest Plan, specifically the standards for MA 6, provides protection for rare upland communities (e.g. glades, barrens, etc.) where these plant species may occur. These

standards would protect nearly all of the habitats associated with these sensitive plant species. In an effort to lessen the potential direct impacts to sensitive plants, identified plant locations would be flagged and proposed segments will either be dropped from consideration or be re-routed to avoid significant plant populations and fire lines used for prescribed burning would take advantage of existing natural barriers such as existing roadways and streams and utilize hand lines within SMA limiting the amount of disturbance in preferred habitats.

Prescribed Fire & Glade Restoration

The ONF, in its development of the Revised Forest Plan, placed special emphasis on conservation and restoration of rare systems or communities. Effects from prescribed fire would vary due to fire intensity, aspect, and slope and it would be expected that some degree of forest floor cover would be removed. Prescribed fire could directly impact these sensitive plant species if burning was performed during a growing season and individual plants were top-killed, but is unlikely due to implementation of most burning occurring during plant dormancy and that the habitat systems terrain, carry fire poorly.

Prescribed fire will open the canopy and reduce vegetative competition, thus improving habitat for these species. The plant species listed are fire-dependent, and have therefore evolved in an environment shaped by fire and require it to maintain their preferred habitat. In particular, maximum positive effects would be seen if habitats such as woodlands are burned on a 3-4 year rotation basis, along with timber or silvicultural and wildlife treatments.

No Herbicide

The No Herbicide alternative would have no direct or indirect effects as a result of deferred herbicide use. However, effects from mechanical/non-herbicide treatments would be the same as in Proposed Action alternative.

Cumulative Effects

No Action

The No Action alternative would allow natural processes to occur without human intervention. Only natural disturbances would cause changes to these sensitive plant species and their associated glade and similar habitats. These changes would be expected to be within the normal range of habitat fluctuation that occurs naturally and to which these species are adapted. The No Action alternative would have no cumulative effect on these plant species as a result of deferred management.

Proposed Action & No Herbicide

There would be no cumulative effects resulting from the proposed action because there are no other past, present, or reasonably foreseeable future actions that would result in additional effects on these sensitive plant species. Actions would mimic natural fire and would be expected to be within the normal range of habitat fluctuation that occurs naturally and which

would benefit these sensitive plant species by restoring and maintaining their preferred habitats.

Management Indicator Species and Habitat (MIS)

Current Conditions

The MIS Revised Forest Plan selection process reviewed the Ouachita National Forest list of MIS, and concluded that the 24 species listed in Table 14 (USDA Forest Service 2005b) were adequate to address the effects of management on fish and wildlife populations, their habitat needs as well as demand species and species of special interest. These 24 species represent a broad array of habitats covering diverse geographic areas within the ONF, as well as inhabiting areas with diverse management objectives.

MIS Selected for This Project: The entire list of 24 MIS was reviewed and a subset was selected for this project. The MIS selected include 6 terrestrial species and 7 fish species. Species not known to occur within the action area, lacking suitable habitat, or not tied to an appropriate evaluation objective were not selected, as indicated in the far right column of the table below.

Management Indicator Species and primary reason for selection (Table 3.6)

The far right column indicates which Forest MIS species are selected for this project.

Common Name	Scientific Name	Primary reason(s) for selection	Selected as MIS for Project (Yes/No)
Terrestrial MIS			
Northern Bobwhite	<i>Colinus virginianus</i>	To help indicate effects of management on public hunting demand and to help indicate effects of management on the pine-oak woodland community	Yes
Eastern wild turkey	<i>Meleagris gallopavo</i>	To help indicate effects of management on public hunting demand	Yes
White-tailed deer	<i>Odocoileus virginianus</i>	To help indicate effects of management on public hunting demand	Yes
Red-cockaded woodpecker	<i>Dryobates borealis</i>	To help indicate effects of management on recovery of this endangered species and to help indicate effects on management of shortleaf pine-bluestem woodland community	No (outside MA 22) (does not occur in area)
Prairie warbler	<i>Dendroica discolor</i>	To help indicate effects of management on early successional component of forest communities	No
Scarlet tanager	<i>Piranga olivacea</i>	To help indicate effects of management on mature forest communities	Yes

Common Name	Scientific Name	Primary reason(s) for selection	Selected as MIS for Project (Yes/No)
Pileated woodpecker	<i>Dryocopus pileatus</i>	To help indicate effects of management on snags and snag-dependent species	Yes
Ponds and Lakes (No recreation fishing ponds exists within the project areas)			
Bluegill	<i>Lepomis macrochirus</i>	To help indicate management effects on health of ponds and lakes and demand for recreational fishing.	No
Redear sunfish	<i>Lepomis microlophus</i>		No
Largemouth bass	<i>Micropterus salmoides</i>		No
Arkansas River Valley Streams (Analysis area occurs outside of the Arkansas River Valley Ecoregion)			
Yellow bullhead	<i>Ameiurus natalis</i>	To help indicate effects of management on aquatic habitat and water quality in streams within the Arkansas River Valley Ecoregion.	No
Highland stoneroller	<i>Campostoma spadiceum</i>		
Redfin darter	<i>Etheostoma whipplei</i>		
Green sunfish	<i>Lepomis cyanellus</i>		
Longear sunfish	<i>Lepomis megalotis</i>		
Gulf Coastal Plain Ecoregion Streams (Analysis area occurs outside of the Gulf Coastal Plain Ecoregion)			
Pirate perch	<i>Aphredoderus sayanus</i>	To help indicate effects of management on aquatic habitat and water quality in streams within the Gulf Coast Plain Ecoregion.	No
Highland stoneroller	<i>Campostoma spadiceum</i>		
Creek chubsucker	<i>Erimyzon oblongus</i>		
Green sunfish	<i>Lepomis cyanellus</i>		
Longear sunfish	<i>Lepomis megalotis</i>		
Ouachita Mountain Ecoregion Streams			
Highland stoneroller	<i>Campostoma spadiceum</i>	To help indicate effects of management on aquatic habitat and water quality in streams within the Ouachita Mountain Ecoregion.	Yes
Johnny darter	<i>Etheostoma nigrum</i>		No (Glover & Mt. Fork Rivers only)
Orangebelly darter	<i>Etheostoma radiosum</i>		No
Redfin darter	<i>Etheostoma whipplei</i>		Yes

Common Name	Scientific Name	Primary reason(s) for selection	Selected as MIS for Project (Yes/No)
Northern studfish	<i>Fundulus catenatus</i>		Yes
Northern hog sucker	<i>Hypentilium nigricans</i>		No
Green sunfish	<i>Lepomis cyanellus</i>		Yes
Longear sunfish	<i>Lepomis megalotis</i>		Yes
Striped shiner	<i>Luxilus chrysocephalus</i>		Yes
Smallmouth bass	<i>Micropterus dolomieu</i>		Yes
Channel darter	<i>Percina copelandi</i>		No (Glover & Mt. Fork Rivers only)
Forest-wide			
Smallmouth bass	<i>Micropterus dolomieu</i>	To help indicate the effects of management on meeting public fishing demand in streams	Yes

Direct & Indirect Effects

All species: Wildlife pond reconstruction/maintenance will not affect any species negatively. Terrestrial species may benefit from the 1/8 to 1/4 acre ponds where water is scarce on ridgetops and streams are not holding summer water. Ponds will be built far enough away from drains and streams that sedimentation should have no effect on aquatic species. These ponds are not for fish, rather drinking water and habitat for amphibians and aquatic insects.

Also, Wildlife opening construction and decommissioning will both create and remove habitat for MIS terrestrial species, while Recreational Trailhead Parking construction will have effects similar to Timber, Silvicultural & Wildlife Activities, and the effects of Glade Restoration would be similar to Prescribed Fire and Timber, Silvicultural & Wildlife Activities.

Northern Bobwhite

Current Conditions

This species was selected to help indicate effects of management on meeting public hunting demand, and to help indicate effects of management on the pine-oak woodland community. Northern Bobwhites require a diverse, heterogeneous habitat that includes open areas of herbaceous vegetation for foraging, grassy areas for nesting, heavy brush or woody cover, and bare ground with little litter cover (Rosene, 1984) (Roseberry & Sudkamp, 1998) (Brennan, 1999). They also readily use early pine and pine-hardwood forest conditions for foraging, hiding, nesting, and rearing young (Brennan, 1999). Bobwhites are usually

associated with early successional plant communities, and their abundant herbaceous plants, seed crops, fruits, and insect prey items are vital to their life history (Brennan, 1999) (Dimmick, Gudlin, McKenzie, & Wells, 2004).

Inventory tools collectively indicate a declining bobwhite population and approximately stable habitat capability (USDA Forest Service, 2011). From 2002-2012, the Arkansas population has declined 6% (Sauer et al. 2014). Regional and range-wide declines for Northern Bobwhite are primarily attributed to the loss of agricultural land and changes in agricultural practices (Brennan, 1999) (Dimmick, Gudlin, McKenzie, & Wells, 2004). Population decline in the Ouachita Mountains is attributed to a reduction in available early forest stage cover habitat conditions (Thompson & DeGraaf, 2001) (Riddle, Moorman, & Pollock, 2008) (USDA Forest Service, 2011). Bobwhite counts in 2017 by various agencies were about equal to the preceding 8 years, but showed a slight rise from 2016 numbers and ONF early seral creation numbers were up from 676 acre in 2016 to 2,048 in 2017.

Direct and Indirect Effects

No Action

The No Action alternative would have an overall negative effect on the forest-wide population trend for this species by lack of creation of foraging opportunities.

The retention of the overstory without disturbance would have several negative effects on bobwhite. As crowns continued to develop and increase in volume, mast production in the form of acorns would also increase until crown closure and competition for sunlight, moisture, and nutrients limited productivity and stressed trees. Hardwood and pine habitats would become homogeneous with little diversity. Shade-tolerant species such as red maple (no nutritive value to bobwhite) would flourish in the mid and understory with significant root development already established while waiting for the opportunity to occupy the overstory in tree-fall gaps or when stand replacement events such as wildfire, insect infestation or ice storms occurred. Such replacement would result in loss of hard mast (Zaczek, Groninger, & Van Sambeek, 2002). Other shade tolerant midstory species such as dogwood, serviceberry and farkleberry would provide soft mast, but over time the volume would decline as availability of sunlight decreased with overstory closure. Herbaceous and grassy ground cover would fade and essentially disappear, resulting in loss of brood range and associated seeds and berries and insect and spider populations important to poult growth and development (Dimmick, Gudlin, McKenzie, & Wells, 2004) (Masters & Wilson, 1994) (Fenwood, Urbston, & Harlow, 1984). The additive beneficial impacts of fire, herbicide and road and fire line corridors and associated early seral habitat often used for nesting cover and travel ways would not occur.

Proposed Action

Timber and Silvicultural Activities

Existing nests with eggs could be damaged or destroyed if operations occur during nesting season. However, the majority of stands that would receive treatment do not currently offer suitable nesting habitat because they are too dense and the presence of nesting birds is

unlikely (Brennan, 1999). Bobwhites may be temporarily displaced during resource management activities and females may abandon nests (Brennan, 1999).

Habitat conditions for retained hardwood (soft and hard mast-producing trees) would be enhanced (Perry & Thill, 2003) (Perry, Thill, Peitz, & Tappe, 1999). The reduction in the density of trees and associated shade would provide better nesting and brooding habitat due to increased food and cover plant development (Yarrow & Yarrow, 2005) (Dimmick, Gudlin, McKenzie, & Wells, 2004). Herbicide application would inhibit re-sprouting of targeted vegetation, thereby prolonging the desirable effects of these harvests and silvicultural treatments.

Existing nests with eggs may be damaged or destroyed if operations occur during the nesting season. The majority of stands where site preparation treatment occurs would typically not have time to develop suitable herbaceous conditions between harvest completion and implementation. Stands to receive release treatments are older and well established and would have already developed pine and hardwood woody structure and an herbaceous understory. However, woody stems are often dense and do not offer appropriate nesting habitat. A reduction of woody stems, particularly hardwood stems, would reduce shade and enhance herbaceous ground cover. Bobwhites may be temporarily displaced during resource management activities and females may abandon nests.

Habitat conditions for nesting and brooding would be improved. Herbicide application to felled stems would prevent re-sprouting of targeted vegetation and prolong use of these resulting habitat conditions, especially when combined with prescribed fire and/or mechanical treatments (Jones & Chamberlain, 2004) (Welch, Miller, Palmer, & Harrington, 2004).

Prescribed Fire

Fire helps maintain, restore, and enhance early forest stage ground cover conditions important to this bird (Burger Jr, 2001) (Cox & Widener, 2008) (Dimmick, Gudlin, McKenzie, & Wells, 2004) (Jones & Chamberlain, 2004) (Klaus, Rush, Keyes, Petrick, & Cooper, 2010) (Palmer, Robertson, & Masters, 2004). Direct effects of dormant or growing season burns are unlikely to affect this bird, except for rare occasions, because adults are highly mobile and chicks are born precocial (with a compliment of feathers) and are active and mobile soon after hatching (Martin, Palmer, Grimes, & Carroll, 2010). If prescribed burns occur during the nesting season (April to September in Arkansas) there is a potential that nests and eggs could be destroyed (James & Neal, 1986). If this occurs, bobwhites may attempt to re-nest, though they generally have lower nest success on subsequent efforts (Burger, Hamrick, & Godwin, 2005).

Transportation System and Fire line Construction

Nests with eggs may be destroyed or abandoned by mobile adults when roads or fire lines are constructed in nesting habitat during nesting season. Bobwhites may be displaced during construction and periods of high activity, such as during forest product removal. Roads and fire lines, when closed, provide additional early seral habitat, resulting in an increase in nesting and/or foraging habitat.

Herbicide Application

Direct effects of herbicide application on birds or nests with eggs are not likely because the primary target in these applications would be felled hardwood brush cut surfaces (stumps or girdle furrows) located in dense forest stands. Neither hardwood brush nor dense stands are preferred nesting habitat due to a lack of grass and herbaceous plants important for nest construction and concealment. Adults and fledglings are highly mobile and would not be directly impacted.

Herbicide application has the potential to temporarily negatively impact foraging and nesting opportunities in small, specific treatment areas by reducing the availability of seeds from woody plants and broadleaf herbaceous species contacted by herbicide.

No Herbicide

The No Herbicide alternative would have an overall positive effect on the forest-wide trends for these species and would be the same as the Proposed Action except the effects attributed to herbicide use would not occur.

Cumulative Effects

No Action

This species prefers open and/or cutover areas and the No action would mean that no new open areas would be created for these species resulting in no creation of early-seral habitats as overstory vegetation becomes established and shades out sub-canopy competition. Natural recruitment of early seral communities would also be limited in that suppression of wildfires and timber insect infestations would still occur. Limited development of early seral habitat in the watershed would only provide minimal habitat for these species.

Proposed Action & No Herbicide

There would be no cumulative effects resulting from any alternative because there are no other past, present, or reasonably foreseeable future actions that would result in additional effects on these sensitive MIS species.

Prairie Warbler

Current Conditions

This species was selected to help indicate effects of management on the early successional component of forest communities. A Neotropical migrant, it selects early forest stage habitats such as regenerating old fields, pastures, clear cuts, and utility rights-of-way habitats (King, Chandler, Collins, Petersen, & Lautzenheiser, 2009). Habitat conditions for nesting occur in the later stages of early forest cover, when vegetation has grown out of the grass/herbaceous phase.

Prairie Warbler Breeding Bird Survey data for Arkansas show a 3.0% decrease in the state from 1966-2012 (Sauer, et al., 2014). Based on data available from the forest Landbird point count data (1997-2017) the Prairie Warbler shows a slight downward trend (but not statistically significant) trend since 2012 where it remained through 2014. Throughout the range of this bird, a downward trend is indicated. Decline is thought to be related to the decline in acres of early seral habitat available (USDA Forest Service, 2018). It is possible

that the impact of timber management and burning are not fully realized but the ONF is moving forward toward the goal of both in hopes of stabilizing the species on the forest.

Direct, Indirect, and Cumulative Effects

All alternatives

The early forest cover habitat needs and effects of alternatives on this species are analogous to those for the Northern Bobwhite, with prescribed fire and timber treatments having an overall beneficial effect on this species (Askins, 2007). The prairie warbler does have a larger home range of up to 1 mile. See Northern Bobwhite above for effects disclosure. (Comer, Bell, Oswald, Conway, & Burt, 2011).

Eastern Wild Turkey

Current Conditions

Eastern Wild Turkey was selected to help indicate effects of management on meeting public hunting demand. This species is a highly prized game animal that uses a wide range of habitat types (generalist) with habitat diversity needs that include grass and forb openings (seeds, fruits, berries, insects) interspersed with older timber stands capable of producing hard (acorns) and soft (fruits/berries) mast (Eaton, 1992). Various successional forest conditions, ranging from early forest stage cover to mature growth, are required to meet the needs of turkey populations (Yarrow & Yarrow, 2005).

Long-term turkey harvest, habitat capability modeling, and BBS data indicate overall positive trends for the turkey population. In Arkansas the Wild Turkey has increased 6.49% from 1966–2012 (Sauer, et al., 2014). Although there are variations in poult production and habitat capability from year to year, this species is not likely in danger of falling significantly below desired population levels and it is not of viability concern at this time (USDA Forest Service, 2005b). Wild Turkey reproduction appears to be decreasing on the ONF as seen in turkey poult counts and Landbird Point Counts. Poor hatch records continue to be an issue across the state (USDA Forest Service, 2018).

Direct and Indirect Effects

No Action

The No Action alternative would have a neutral to slightly negative effect on the forest-wide population trend for this species. This alternative would have no direct effects on eastern wild turkey over the next decade and only events unrelated to human activities would create forestland openings used by these species.

The retention of the overstory without disturbance would have several effects on turkey. As crowns continued to develop and increase in volume, mast production in the form of acorns would also increase until crown closure and competition for sunlight, moisture, and nutrients would result in limited productivity and stressed trees. Hardwood and pine habitats would

become homogeneous with little diversity. Shade-tolerant species such as red maple would flourish in the mid and understory, with significant root development already established and waiting for the opportunity to occupy the overstory in tree-fall gaps or when stand replacement events such as wildfire, insect infestation or ice storms occurred. Such replacement would result in loss of hard mast (Zaczek, Groninger, & Van Sambeek, 2002). Other shade tolerant midstory species such as dogwood, serviceberry and farkleberry would provide soft mast, but over time the volume would decline as availability of sunlight decreased with overstory closure. Herbaceous and grassy ground cover would fade and essentially disappear, resulting in loss of brood habitat and its bounty of seeds, berries and insect and spider populations important to poult growth and development (Dickson, 2001) (Masters & Wilson, 1994) (Fenwood, Urbston, & Harlow, 1984). The additive beneficial impacts of fire, herbicide and road and fire line corridors and associated edge habitat often used for nesting cover and travel ways would not occur.

Proposed Action

The Proposed Action would have an overall positive effect on the forest-wide population trend for this species by increasing foraging opportunities.

Timber, Silvicultural/Wildlife Activities

There would be no direct effects on mobile adult birds or poults, but existing nests with eggs may be damaged or destroyed if operations occur during nesting season and in nesting habitat. Turkeys may be temporarily displaced during resource management activities and nests may be abandoned.

The major reduction in the density of trees and associated shade in stands treated by these methods would increase the herbaceous and grass species important for the food and cover requirements of Wild Turkey (Eaton, 1992). A loss of some to all hard and soft mast production capability from hardwood trees could occur for an extended period of time where hardwood trees are removed during harvest and/or silvicultural activities to reestablish pine forest types (as in clear cut and seed-tree harvests and creation of permanent openings). Hens tend to select areas of sparse overstory and midstory with abundant ground cover that provides plenty of seeds, fruits and arthropod prey species (Eaton, 1992). Commercial and non-commercial thinning sites and wildlife habitat improvement stands are examples of such areas. Nesting habitat and brood range, currently in short supply throughout the Project Area, would be created. Areas treated by these methods would not result in dense, residual stands of tree cover preferred in fall and winter. However, the majority of residual non-treated stands would provide adequate winter habitat well distributed in the Project Area. The response of herbaceous biomass to harvest, in declining order by method, would be clear cut, seed tree, and thinnings. A good mix of these harvest types would provide for excellent turkey habitat (Yarrow & Yarrow, 2005) (Eaton, 1992) (Dickson, 2001). Habitat conditions for retained hardwood overstory and midstory soft and hard mast producers would be enhanced by reducing competition for growing space, nutrients and water. Dogwood, blackgum and farkleberry fruits, and acorns from hardwood trees of mast producing age would provide important fall and winter cover and foods (Steffen, LaFon, & Norman, 2002) (Dickson, 2001).

The majority of stands to receive site preparation treatment would not have time to develop suitable nesting habitat conditions between harvest completion and the implementation of site preparation activities, although grassy patches used for nesting could exist. Stands to receive release treatments would have already developed pine and hardwood woody structure and an herbaceous understory but woody stems could be too dense to offer good nesting habitat. Prior to release, utilization of untreated stands would be unlikely. Turkey may be temporarily displaced during resource management.

Due to reduced stem density habitat conditions for nesting and brooding would be improved (Eaton, 1992). Herbicide application to felled stems would prevent re-sprouting of targeted vegetation and prolong habitat available for use by this bird as would prescribed fire treatments.

Prescribed Fire

Direct effects of dormant or growing season burns on this bird are likely to be minimal because adults are highly mobile and poults are precocial and able to follow the hen within one to two days of hatching. Nests, eggs, and non-mobile hatchlings may be destroyed by growing season burns, but the benefits of improved habitat outweigh the nests lost, and in many cases females would likely re-nest (National Wild Turkey Federation, 2006). In September 2008, a letter supporting application of prescribed fire on the ONF was sent to Arkansas Senators Blanche Lincoln and Mark Pryor from Dr. Earl Kennamer, Senior Vice President for Conservation Programs, National Wild Turkey Federation (Kennamer, 2008). In May 2009, Dennis Daniel, Regional Biologist, National Wild Turkey Federation, submitted a letter in support of prescribed burning to local area newspapers in response to complaints and queries from the public (Daniel, 2009).

Fire helps maintain, restore and enhance early forest stage ground cover plants especially after timber thinning in middle-aged to older pine stands. Many important wild turkey foods such as native legumes are fire adapted and promoted by fire (Dickson, 2001). Fire also plays an important role in the development and maintenance of oak forests that provide important winter foods (acorns) used by turkeys (Van Lear & Brose, 2002) (Cooper, Van Lear, & Brose, 2000) (Crow, Johnson, & Adkisson, 1994) and fruit yields of woody plants consumed at other times of the year (Stransky & Hall, 1979). Turkeys prefer to forage in southern pinelands; especially those burned within the past two years, because of an increase in insects they may prefer to nest there as well (Yarrow & Yarrow, 2005) (Cox & Widener, 2008).

Transportation System and Fire line Construction

Roads and fire lines that are constructed within nesting habitat during nesting season may destroy nests and eggs or adults may abandon their nests and be displaced during construction and periods of high activity, such as during forest product removal. These same roads and fire lines, when closed, would provide additional early seral habitat and provide additional nesting and/or foraging habitat.

Herbicide Application

Direct effects of herbicide application on birds or nests with eggs are not likely because the primary target in these applications would be felled hardwood brush cut surfaces (stumps or

girdle furrows) located in dense forest stands. Neither hardwood brush nor dense stands are preferred nesting habitat due to a lack of grass and herbaceous plants important for nest construction and concealment. Adults and fledglings are highly mobile and would not be directly impacted.

Herbicide application has the potential to temporarily negatively impact foraging and nesting opportunities in small, specific treatment areas by reducing the availability of seeds from woody plants and broadleaf herbaceous species contacted by herbicide.

No Herbicide

The No Herbicide alternative would have an overall positive effect on the forest-wide population trend for this species. The effects of this alternative would be the same as the Proposed Action except the effects attributed to herbicide application would not occur.

Cumulative Effects

All alternatives

There would be no cumulative effects resulting from any alternative because there are no other past, present, or reasonably foreseeable future actions that would result in additional effects on eastern wild turkey.

White-tailed Deer

Current Conditions

White-tailed deer was selected as an MIS species based on its big game status, and because its population levels can be evaluated along with habitat trends (USDA Forest Service, 2005b). This opportunistic herbivore has a diet that includes annual and perennial forbs, fruits, hard mast, grasses, flowers and fungi. Food utilization studies of deer in the southern U.S. show that use of woody twigs, even in winter, is insignificant (Miller, 2001). The quality and quantity of forage (grasses and herbaceous vegetation) have the greatest impacts on whitetail populations. The Ouachita Mountains are considered sub-optimal habitat for deer due to reduced soil fertility and productivity, particularly the level of soil phosphorus that is a useful predictor of potential physiological condition (Miller, 2001). Phosphorus levels of browse in the Ouachita Mountains are considered low (Fenwood, Urbston, & Harlow, 1984).

Forest-wide, according to the 2017 Monitoring report, “the estimated habitat capability for deer is slightly above the desired habitat capability of 38,105 acres for 2017. Deer are widespread, abundant and their habitat capability is just above the Forest Plan projection. There are no indications of a need for adjustment in current management practices (USDA Forest Service, 2018).

Direct and Indirect Effects

No Action

The No Action alternative would have a neutral to slightly negative effect on the forest-wide population trend for this species. This alternative would have no direct effects on white-tailed deer over the next decade. Succession would continue in all forest types, with habitat becoming more homogeneous and less diverse. Dense stands would provide excellent escape and winter cover. Though the forest types would continue to be a source of hard mast, the early forest stage cover also needed by white-tailed deer would only occur through natural events such as wildfire, ice damage, insect infestation, etc.

Proposed Action

The Proposed Action would have a positive effect on the forest-wide population trend for this species.

Timber, Silvicultural/Wildlife Activities

Deer may be temporarily displaced from harvest areas during resource management activities, though no direct loss would occur. When followed by related silvicultural treatments and fire, the persistence of the early seral habitat conditions would be extended. The reduction in the density of trees and associated shade would result in improved habitat conditions for forest floor food and cover plants benefiting deer (Fenwood, Urbston, & Harlow, 1984). These previously described food items are more important than browse (twigs, shoots, and leaves of shrubs, trees and vines) which constitutes only a moderate portion of a deer's diet (Miller, 2001). The response of herbaceous forage species to harvest, in declining order by method, would be clear cut, permanent openings, seed tree, then, thinnings. A good mix of these harvest methods would provide excellent deer habitat (Yarrow & Yarrow, 2005).

Stands receiving site preparation treatment would be those where clear cut and seed-tree harvest had occurred. An increase in sunlight to almost complete openness would enhance herbaceous and grass diversity and growth, providing excellent foraging conditions for deer (Yarrow & Yarrow, 2005). Stands receiving release treatments would have developed pine and hardwood woody structure and an herbaceous understory, but woody stems would be dense. Following treatment and stem reduction these stands would offer similar food items as site prepared stands, but the volume of food would not be as great and would decline more quickly due to crown closure by residual trees.

Prescribed Fire

Deer may be temporarily displace during activities but would return to the area with the increase in vegetation and browse. Prescribed fire would increase browse, forbs, grass and legume production, palatability, and nutrition (Masters, Lochmiller, McMurry, & Buckenhofer, 1998) (Masters & Waymire, 2000). Fire also plays an important role in the development and maintenance of oak forests that provide important winter deer foods (acorns) (Van Lear & Brose, 2002).

Transportation System and Fire line Construction

Deer may be temporarily displaced during construction and periods of high traffic volume during product removal. Closed roads and fire line corridors provide additional edge habitat, travel ways, escape routes, and potential foraging areas and bedding sites. Typical forest open roads have very low traffic levels except during the fall deer season and generally would have little to no effect on deer activity.

Herbicide Application

Use of herbicide in silvicultural and wildlife treatments involves low concentrations (pounds per acre) of chemicals and specific application sites in the form of cut stumps and the furrows girdled into tree boles. Deer may be displaced during application of herbicide (due to human disturbance) but this will be for a relatively short period of time in any treatment area. The application of herbicides will lengthen the duration of early seral habitat where applied, thus maintaining appropriate habitat patches for white-tailed deer.

No Herbicide

The No Herbicide alternative would have an overall positive effect on the forest-wide population trend for this species. The effects of this alternative would be the same as the Proposed Action except the effects attributed to herbicide application would not occur.

Cumulative Effects

All alternatives

There would be no cumulative effects resulting from any alternative because there are no other past, present, or reasonably foreseeable future actions that would result in additional effects on white-tailed deer.

Pileated Woodpecker

Current Conditions

This woodpecker was selected as an MIS to help indicate the effects of management on snags and snag-dependent species. The Pileated Woodpecker is a member of the cavity nesting, tree trunk probing, insectivore guild that is found in open, upland mature pine and pine-hardwood stands and dense mature to over-mature hardwood and hardwood-pine forest types (Degraaf, Scott, Hamre, Ernst, & Anderson, 1991) (Hamel, 1992) (Bull & Jackson, 2011). A year-round resident of the Ouachita Mountains, this bird is a primary excavator of cavities important to obligate secondary cavity nesters (animals that do not themselves excavate cavities), and is a key indicator for the retention of a complete community of cavity nesting species that include other birds, mammals, reptiles, and amphibians (Bonar, 2000) (Trauth, Robison, & Plummer, 2004).

Population trend and habitat capability data for this bird are mixed (USDA Forest Service, 2011). BBS data indicate a downward trend of 1.18% for Arkansas from 1966–2012 with a less intense decrease of 0.99% in most recent years, from 2002–2012 (Sauer, et al., 2014). The 2000 - 2009 Forest Data show a slight decrease in the number of Pileated Woodpeckers

observed and a slight increase in habitat capability (USDA Forest Service, 2010). Phase II research data from the Winona Unit of the District indicated an upward population trend within pine and pine-hardwood forest types, primarily because the timber is aging, growing larger, and providing more suitable habitat conditions (USDA Forest Service, 2010). The 2017 Forest Monitoring Report shows an overall downward trend, though the numbers of Pileated Woodpeckers from the 2017 Landbird Point data shows an increase in individuals (USDA Forest Service, 2018). They are an adaptable species and frequently disperse widely throughout their range, thus, viability is not in question (Edworthy, Drever, & Martin, 2011).

Direct and Indirect Effects

No Action

No direct effects on pileated woodpecker would occur under the No Action alternative. Selection of this alternative for the most part would have positive indirect effects on populations of pileated woodpecker as this species prefer mature forest habitats. Selection of this alternative would prevent timber harvest and related activities, allowing the forest to continue to age. As a result, the older forests preferred by these species would continue to grow and mature and create retention of dead and dying trees found throughout the landscape.

The retention of the existing forested conditions without disturbance would offer suitable nesting and foraging habitat. All timber would increase in size eventually providing snags of suitable size for cavity excavation and basal areas would remain high and less open than treated stands in other alternatives. Snags would be recruited as logs without potential loss due to consumption by prescribed fire. Hard mast production would increase until overcrowding and competition for nutrients, water and space occurred, and then level-off and/or decline. Age of timber would also factor in reduced mast production levels as trees move past their maximum reproduction potential. Soft mast from trees would be produced but at lesser levels due to shading from the overstory. Soft mast from herbaceous plants and shrubs would decline and eventually fade as openings were shaded except in tree-fall gaps and where stochastic events occurred.

Proposed Action

Timber, Silvicultural/Wildlife Activities

Felling/damaging large snags during the nesting season could result in loss of eggs or nestlings. Abandonment of nests and/or displacement of adult woodpeckers may occur during resource management activities, but mobile adult and juvenile birds would not be directly impacted.

Thinning harvests in older pine types may offer areas for nest establishment when snags and trees of suitable dbh are available. Not retaining large diameter snags during follow-up silvicultural activities would negatively affect nesting opportunities. The acreage of older, larger pine trees would be reduced following commercial timber sales, especially in clear cut and seed tree areas and where permanent openings were established and maintained. Clear

cut and seed-tree harvested areas and pre-commercially thinned young stands would not offer suitable nesting habitat or adequately sized snags for decades, depending on site productivity.

Areas where stem density was significantly reduced would result in elevated fruit and seed production and insect populations that could provide foraging sites for up to a decade (Edworthy, Drever, & Martin, 2011). Treatment of some hardwood stands for midstory removal and overstory development of residual trees would provide long-term benefits to this bird by allowing residual stems to grow larger due to reduced competition, resulting in large numbers of snags. Not treating other hardwood stands would provide for a diverse mix of hardwood stands and stem densities. Meeting Revised Forest Plan design criteria WF005 (snags), WF006 (mature growth) and WF007 (woody debris) would provide preferred Pileated Woodpecker habitat in the project area.

Small diameter woody debris generated through release activities would not provide preferred or typical foraging substrate for this bird, which prefers large diameter logs and snags that have deteriorated to the point where invasion by insect prey is possible (Hura & Crow, 2004). Larger diameter woody debris generated by site preparation could eventually provide habitat for insects and foraging substrate for this woodpecker, but not immediately. Increased forest floor light levels would enhance growth of herbaceous plant and grass species important in the production of soft mast and vegetative cover for various prey populations.

Prescribed fire

Adult birds are highly mobile and would experience no direct effects. Growing season burns could directly affect nests with eggs and nestlings if the cavity tree in which they occur is damaged or felled due to burn-through, or perhaps abandoned if exposed to prolonged periods of smoke. However, it should be noted the Ouachita Mountains is a fire-maintained ecosystem, resulting in organisms that are adapted to frequent fire events.

Indirect effects may include the loss of large snags (and potential nest sites) felled as a result of burning activities, but snags are rarely consumed and if felled by burn-through would contribute to foraging substrate as logs. On rare occasions, hot spots within prescribed burns may cause tree mortality, eventually providing replacement snags that serve as vertical foraging substrate and potential cavity excavation sites. Prescribed fire would also enhance and encourage growth of herbaceous and woody ground cover responsible for berry and seed production and resulting enhanced insect populations.

Transportation System and Fire line Construction

Nests with eggs may be destroyed or abandoned if road or fire line construction results in the removal of snags containing nests. Mobile adults would not be impacted. Woodpeckers may be displaced from nest sites if road construction and prolonged use occur adjacent to occupied snags during nesting season. Disturbance from fire line construction would be brief as equipment quickly passes through any particular area. Fire lines receive minimal and infrequent use and have less disturbance impact than roads. Closed roads and fire line would provide flight corridors through dense timber.

Herbicide Application

Given the low risk of toxicity exhibited in invertebrates, no indirect impacts to this bird are expected from consumption of insects within treated areas. Logs and snags used as primary foraging substrate would not be treated. Indirect effects would most likely be due to temporary loss of some woody shrubs, and annual and perennial broadleaf herbaceous plant species that provide shelter and food sources for insect and spider populations that may contribute to this bird's diet. Acute oral and dietary studies of the listed chemicals exhibit a range in analysis toxicity from practically nontoxic to slight toxicity to birds.

No Herbicide

The No Herbicide alternative would have an overall positive effect on the forest-wide trends for these species and would be the same as the Proposed Action except the effects attributed to herbicide use would not occur.

Cumulative Effects

All alternatives

There would be no cumulative effects resulting from any alternative because there are no other past, present, or reasonably foreseeable future actions that would result in additional effects on pileated woodpecker.

Scarlet Tanager

Current Conditions

Preferred habitat for this Neotropical migrant is composed of older growth, uneven-aged forests with a well-developed but broken canopy and a well-developed woody and herbaceous understory. This species is abundant in mature hardwood stands and hardwood stands harvested by single tree selection in the central hardwood forests of the nearby Ozarks, but it is uncommon or not present in loblolly and shortleaf pine forests (Rosenberg, et al., 1999) (Hunter, Dickson, Pashley, & Hamel, 2001). However, in a study area that included the Ouachita Mountains of Arkansas, this species did not show a preference between mixed deciduous/coniferous forest habitats. Further studies have found that Scarlet Tanagers typically inhabit areas with high canopy, dense canopy cover, a large variety of tree species, a high density of large trees, and steep slopes (Mowbray, 1999). This species is insectivorous during the breeding season, with prey items including caterpillars, moths, bees, wasps and beetles. Foraging primarily occurs in the mid-canopy. From late summer their diet includes many berries and other fruits that appear to be especially important for fat deposition before fall migration.

Breeding Bird Survey results from 1966–2012 in Arkansas indicate a slightly declining population, with a 0.33% reduction in population levels (Sauer, et al., 2014). The Landbird Points data from 2006–2017 suggest an overall decreasing trend; however, 2017 showed higher numbers of individuals than in 2016, similar to 2014 and 2015. The last four years have shown the lowest numbers of 12 years of recording but the trend is not statically significant and the population could reflect natural variability (USDA Forest Service, 2018).

Direct and Indirect Effects

No Action

No direct effects on scarlet tanager would occur under the No Action alternative. Selection of this alternative for the most part would have positive indirect effects on populations of this species prefer mature forest habitats. Selection of this alternative would prevent timber harvest and related activities, allowing the forest to continue to age. As a result, the older forests preferred by these species would continue to grow and mature and create retention of dead and dying trees found throughout the landscape. The retention of existing pine and hardwood forested conditions without human-caused disturbance would continue to offer nesting and foraging habitat.

Proposed Action

Timber and Silvicultural Activities

The felling of timber from hardwood or mixed stands of older pine and hardwood may result in loss of eggs or nestlings, if present, but would have no effect on mobile adult birds. Direct effects on nests with eggs or hatchlings would be unlikely to occur in commercially harvested pine forest types because pine forests are not preferred nesting habitat. Direct effects to nests with eggs or nestlings could occur in hardwood stands receiving midstory and/or overstory treatments where stems may be felled. Ideally this would be avoided by performing these actions outside of the primary nesting season.

The reduction in trees in seed-tree and clear cut harvest areas would increase the herbaceous and grass species important for fruit, berry and seed production and insect and spider populations. Such areas would provide good foraging habitat during nesting season (insects) and as birds fatten for migration (fruits/berries/seeds), especially when located adjacent to their preferred, mature hardwood or hardwood-pine conditions (Mowbray, 1999). However, early seral created near mature hardwood might create an edge-effect and could cause nest parasitism by brown-headed cowbirds. Wildlife Habitat Improvement (midstory removal and overstory development in hardwood/hardwood-pine forest types) would indirectly impact this bird in two ways: the removal of some but not all of the midstory would reduce the areas available for nest placement. Further, the spacing of overstory trees would enhance future development of older growth and old growth conditions readily used by this bird, due to the well-developed but broken forest canopy conditions that result from this treatment.

Released sites would offer some foraging opportunities. Site prep areas would set the stage for abundant ground cover with increased foraging opportunities. However, these opportunities would fade in less than 10 years.

Prescribed fire

Prescribed fire during the nesting season could temporarily displace adults or cause nest abandonment by adults. It would not be intense enough to destroy nests, eggs or nestlings because nests would be located well above ground level (Mowbray, 1999).

Beneficial impacts to fruit and seed production would result from prescribed fire, especially in pine forest types. Prescribed fire would have little effect on hardwood stands because of higher moisture levels in the soil, increased shading, reduced fire intensity, and reduced levels of fine fuels, other than leaves needed to carry fire.

Transportation System and Fire line Construction

The felling and removal of timber during road building and fire line construction activities could result in loss of eggs or nestlings, if present, but would have no effect on mobile adult birds. Birds may be displaced from nest sites, especially if road construction and prolonged use occurs adjacent to occupied nests. Fire line construction would occur quickly, receive little use, and would have less impact than open roads. Closed roads and fire lines would provide flight corridors through dense timber and possibly areas to forage for fruits and insects.

Herbicide

Herbicide would not be applied to midstory vegetation at a height where nests would occur. Felled stems in midstory and overstory would have herbicide applied to girdled furrows and/or stumps. Given the low risk of toxicity exhibited in invertebrates, no indirect effects to this bird are expected from consumption of insects or fruits/berries/seeds within treated areas.

No Herbicide

The No Herbicide alternative would have an overall positive effect on the forest-wide trends for these species and would be the same as the Proposed Action except the effects attributed to herbicide use would not occur.

Cumulative Effects

All alternatives

There would be no cumulative effects resulting from any alternative because there are no other past, present, or reasonably foreseeable future actions that would result in additional effects on scarlet tanager.

Aquatic MIS

Current Conditions

Three of the five aquatic MIS categories as listed in Table 3.32 of the Revised Forest Plan Environmental Impact Statement (USDA Forest Service, 2005b) do not occur within the proposed treatment areas and thus were not selected for further analysis. The aquatic communities found within this analysis area are: *Ouachita Mountain Ecoregion Streams and Forest Wide*.

Four MIS fish species of the Ouachita Mountain Ecoregion have no known occurrences in the drainages involved in the proposed analysis area, either at the project site, or downstream or are not designated as ONF MIS species. As a result, Johnny darter, Orangebelly darter,

Northern Hogsucker and Channel darters, were not selected as MIS (USDA Forest Service, 2005b; Robison and Buchanan, 1988).

The 7 fish species selected for this project [Highland stoneroller (*Campostoma spadiceum*), Green sunfish (*Lepomis cyanellus*), Longear sunfish (*Lepomis megalotis*), Redfin darter (*Etheostoma whipplei*), Northern studfish (*Fundulus catenatus*), Smallmouth bass (*Micropterus dolomieu*) and the Striped shiner (*Luxilus chrysocephalus*)] represent a variety of niches filled by fish species in the Ouachita Mountain Ecoregion.

Robison and Buchanan (1988) provide habitat descriptions below for the eight fish MIS selected for this project. The highland stoneroller inhabits small, generally clear streams with gravel, rubble, or exposed bedrock substrates . . . [and] is often the most abundant species in small, clear upland streams. The green sunfish is a highly adaptable species and can be found in almost every type of aquatic habitat in Arkansas. The longear sunfish also occurs in many aquatic habitats, but is most abundant in small, clear, upland streams with rocky bottoms and permanent or semi-permanent flows. The redfin darter occurs in small-to-medium sized streams of high gradient in gravel-bottomed riffles. The northern studfish is found in clear flowing streams and rivers of moderate to high gradient and permanent flow. It preferred stream habitats are quiet, shallow waters along the margins of pools having rock and gravel substrates. The smallmouth bass is mainly an inhabitant of cool, clear mountain streams with permanent flow and rocky bottoms and is more intolerant to habitat alteration than any of the other black basses, and it is especially intolerant of high turbidity and siltation. The striped shiner tends to prefer small to moderate-sized streams with permanent flow, clear water and rocky or gravel substrates. It prefers some current but tends to avoid strong currents (Robison and Buchanan, 1988).

Direct, Indirect and Cumulative Effects

All alternatives

Direct, indirect, and cumulative effects would be the same as those determined for PETS fish and mussel species.

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Appendices

APPENDIX A – Proposed Actions By Compartment and Stand

North Fork Saline Project

Compartment 1435 - North Fork Saline River Project																
Stand	Acres	Management Areas	Harvest Activities					Stand Improvement			Reforestation	Prescribe Burn	Wildlife			
			Clear Cut	Shelter Wood (Plant Seedling if necessary)	Seed Tree (Plant Seedlings if Necessary)	Removal	Commercial Thin	Precommercial Thin	Midstory	Release	SitePrep Manual (Chemical), Mech SP, Site Prep Prescribe Burning	Planting	Fuel Reduction Control Understory Species Wildlife	Midstory/ <i>or Woodland</i>	Ponds/+2 Nest Boxes	Rare Upland Comm creation/Glades
	Acres	Unit	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Each	Each
1	227	17											227		2	4
2	35	17					35		35				35			
3	322	17											322		2	2
4	12	17											12			
5	72	14	72								72	72	72			
6	70	17					70		70				70			
7	129	17											129		2	
8	81	17											81			
9	53	17					53		53				53		1	
10	67	17											67			
11	59	14											59			
12	85	14					85		85				85		1	
13	40	14											40			
14	37	14					37		37				37			
15	45	14											45			
16	105	14					105		104.7				105			
17	47	14					47		47				47		1	
18	238	17											238		2	
19	50	14	50								50	50	50			
20	154	17											154		1	1
29	104	17											104			
30	23	17											23			
31	29	17			29						29		29			
32	26	17		26							26		26			
34	14	17											14			
Total	2124		122.73	26	28.9	0	431	0	431.4	0.0	177	122.7	2124	0+	13	7

North Fork Saline Project

Compartment 1436 - North Fork Saline River Project																	
Stand	Acres	Unit	Harvest Activities					Stand Improvement			Reforestation		Prescribe Burn	Wildlife			
			Clear Cut	Shelter Wood (Plant Seedling if necessary)	Seed Tree (Plant Seedlings if Necessary)	Removal	Commercial Thin	Precommercial Thin	Midstory	Release	Site/Prep Manual (Chemical), Mech SP, Site Prep Prescribe Burning	Planting	Fuel Reduction Control Understory Species Wildlife	Midstory/or Woodland	Ponds/+2 Nest Boxes	Closure of Wildlife Opening	Rare Upland Comm creation/Glades
1	71	17											71				3
2	90	17					90						90				
3	37	17											37				
4	85	17											85				
5	65	17											65				
6	97	17											97		2		
7	21	17											21				
8	10	17					10		10				10				
9	64	17					64		64				64		1		
10	29	17					29		29				29			1	
11	71	20											71				
12	69	17											69				
13	35	17								35			35				
14	53	17									53	53	53				
15	41	20											41			3	
16	58	17					58		58				58				1
17	75	17/20											75				
18	101	17					101		101				101		1		
19	30	17					30		30				30		1		
20	89	17/20											89				
21	11	17											11				
22	25	17					25						25				
23	17	17					17						17				
24	82	20											82				
25	23	17									23	23	23				
26	30	17											30				
28	33	20											33		1		
30	52	17								52			52		1		
31	24	17		24							24		24				
32	34	17											34				
33	20	17											20				
34	23	17		23							23		23				
35	24	17		24							24		24		1		
36	23	17			23						23		23		1		
37	19	17			19						19		19				
38	40	17											40				
39	26	17		26							26		26				
42	103	17											103				
43	73	17											73				
44	37	17								37			37				
Total	1908		0	97	43	0	423	0	291.5	124	215	76	1908	0	9	4	

North Fork Saline Project

Compartment 1437 - North Fork Saline River Project																	
Stand	Acres		Management Areas		Harvest Activities			Stand Improvement			Reforestation		Prescribe Burn	Wildlife			
					Clear Cut	Shelter Wood (Plant Seedling if necessary)	Seed Tree (Plant Seedlings if Necessary)	Removal	Commercial Thin	Precommercial Thin	Midstory	Release	SitePrep Manual (Chemical), Mech SP, Site Prep Prescribe Burning	Planting	Fuel Reduction Control Understory Species Wildlife	Midstory/or Woodland	Ponds/+2 Nest Boxes
	Acres	Unit	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Each	Each	Each
1	38	20											38				
2	48	20											48				
3	95	17/20											95				
4	10	17					10		10				10				
5	87	17/20											87				
6	75	17											75		1		
7	104	17											104	103.8			
8	199	17/20											199	128			
9	38	20											38				
10	56	17					56		56				56				
11	98	17											98	64			
12	147	20											147				
13	43	17/20											43		1		
14	50	17/20											50				
16	87	17											87	86.98	1	1	
17	43	17								43			43				
18	95	17/20											95				
19	94	17											94				
20	144	17											144				
21	54	17/20											54	34			
22	220	17											220				1
23	120	17											120		2	2	
25	118	17											118				
27	31	17											31	31.03			
34	69	20											69				
37	30	17/20								30			30				
38	40	20											40				1
39	116	17/20											116				
48	29	17											29	29			
56	71	17/20											71	22			
75	58	17/20											58				
Total	2506		0	0	0	0	66	0	66	73	0	0	2506	498	5	3	2

North Fork Saline Project

Compartment 1438 - North Fork Saline River Project																		
Stand	Acres	Management Areas	Harvest Activities					Stand Improvement			Reforestation		Prescribe Burn	Wildlife				
			Clear Cut	Shelter Wood (Plant Seedling if necessary)	Seed Tree (Plant Seedlings if Necessary)	Removal	Commercial Thin	Precommercial Thin	Midstory	Release	SitePrep Manual (Chemical), Mech SP, Site Prep Prescribe Burning	Planting	Fuel Reduction Control Understory Species Wildlife	Midstory/or Woodland	Ponds/+2 Nest Boxes	Creation of Wildlife Opening	Rare Upland Comm creation/Glades	
	Acres	Unit	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Each	Each	Each
1	59	17					59		59					59		1		
2	77	17												77				
3	80	17/20												80				
4	52	17												52		1		1
5	49	17/20								49				49		1		
6	194	14/17								194				194				1
7	5	17												5				
8	32	20												32				
9	44	17												44				
10	84	17/20												84				
11	7	17												7				
12	136	17												136	135.8			
13	39	17/20												39		1		
14	38	17								38				38				
15	151	9 20												151				
16	27	17			27						27			27				
17	31	17					31		31					31				
19	123	17								123				123		2		
20	99	17												99		1	1	
21	177	17												177	177.5	2	1	
22	101	17												101	101.1			
23	155	17/20												155	91.7	1		
26	58	17/20												58		1		
29	86	20												86		1		
30	25	17			25						25			25				
31	43	17					43		42.97					43				
32	83	20												83		2		
33	17	17			17						17			17				
34	22	17			22						22			22				
35	32	17												32				
36	16	20												16				
37	7	20												7				
38	29	17			29						29			29				1
39	55	17												55				1
40	23	17			23						23			23				
41	32	17			32						32			32				
42	32	20												32				
43	27	20												27		1		
44	26	17								26				26				
50	111	20												111		1		
53	140	17					140		139.7					140		2		
57	22	20												22				
70	18	17					18		18					18				
Total	2665		0	0	174	0	291	0	290.7	430	174	0		2665	506	18	2	3

North Fork Saline Project

Compartment 1450 - North Fork Saline River Project																
Stand	Acres		Management Areas		Harvest Activities				Stand Improvement			Reforestation	Prescribe Burn		Wildlife	
	Acres	Unit	Clear Cut	Shelter Wood (Plant Seedling if necessary)	Seed Tree (Plant Seedlings if Necessary)	Removal	Commercial Thin	Precommercial Thin	Midstory	Release	SitePrep Manual (Chemical), Mech SP, Site Prep Prescribe Burning	Planting	Fuel Reduction Control Understory Species Wildlife	Midstory/or Woodland	Ponds/+2 Nest Boxes	Rare Upland Community creation and/or G
			Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Each	Each
1	37	17											37			
2	110	17/20											110			2
3	114	6											114			
4	37	20											37			
5	43	17					43		43				43			
6	42	14			42						42		42			
7	84	14	84.005								84	84.01	84			
8	71	14					71		71				71			
9	83	17					83		83				83			
10	54	17					54		54.01				54			
11	46	20											46			
12	28	14					28		28				28			
13	51	14					51		51				51			
14	8	20											8			
15	18	20											18			
16	7	20											7			
17	28	17			28						28		28			
18	27	14											27			
19	8	20											8			
20	27	17			27						27		27			
21	18	20											18			
22	22	17			22						22		22			
23	33	14											33			
24	11	17											11			
25	130	17											130			2
26	45	14											45			
27	81	14											81			
28	24	17			24						24		24			
29	59	17					59		59				59			
30	136	17											136			
31	22	17											22			
32	121	17											121	118.7		
34	29	17											29			
38	33	14					33		33				33			
39	42	14	42								42	42	42			
40	75	17	75								75	75	75			
43	6	14					6		6				6			
Total	1812		201.51	0	144	0	428	0	428.1	0	346	201.5	1812	118.7	0	4

North Fork Saline Project

Compartment 1451 - North Fork Saline River Project																	
Stand	Acres	Management Areas	Harvest Activities					Stand Improvement			Reforestation	Prescribe Burn	Wildlife				
			Clear Cut	Shelter Wood (Plant Seedling if necessary)	Seed Tree (Plant Seedlings if Necessary)	Removal	Commercial Thin	Precommercial Thin	Midstory	Release	SitePrep Manual (Chemical), Mech SP, Site Prep Prescribe Burning	Planting	Fuel Reduction Control Understory Species Wildlife	Midstory/or Woodland	Ponds/+2 Nest Boxes	Creation of Wildlife Opening	
	Acres	Unit	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Each	Each	Each
1	17	20												17			
2	46	14			46						46			46			
3	18	14					18		18					18			
4	89	14								89				89			
5	128	14												128			
6	182	14								182				182			
7	33	14												33			
8	54	14												54			
9	329	14												329			
10	41	14								41				41			
11	111	14					111							111			
12	19	14												19			
13	32	14	32								32	32		32			
14	49	14												49			
15	39	14					39							39			
16	21	20												21			
17	35	14					35							35			
18	7	14					7							7			
19	20	14												20			
20	40	14					40							40			
21	10	14					10							10			
22	15	14												15			
24	52	20												52			
25	152	20												152			
28	11	14					11							11			
34	95	14/17								95				95			
37	40	14								40				40			
38	34	14	34								34	34		34			
40	50	14					50		50					50			
55	27	14												27			
60	33	14												33			
64	17	14												17			
66	27	14								27				27			
67	29	14								29				29			
69	8	14												8			
70	40	20												40			
72	44	14												44			
Total	1994		66	0	46	0	321	0	68	502	112	66	1994	0	0		

North Fork Saline Project

Compartment 1452 - North Fork Saline River Project																
Stand	Acres	Management Areas	Harvest Activities					Stand Improvement			Reforestation	Prescribe Burn	Wildlife			
			Clear Cut	Shelter Wood (Plant Seedling if necessary)	Seed Tree (Plant Seedlings if Necessary)	Removal	Commercial Thin	Precommercial Thin	Midstory	Release	SitePrep Manual (Chemical), Mech SP, Site Prep Prescribe Burning	Planting	Fuel Reduction Control Understory Species Wildlife	Midstory/or Woodland	Ponds/+2 Nest Boxes	Creation of Wildlife Opening
	Acres	Unit	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Each	Each
1	88	14											88			
2	72	14											72			
3	433	14									433	432.6	433		1	1
4	15	14											15			
5	49	14									49	49	49			
6	48	14											48			
7	26	14											26			
8	37	14									37	37	37			
9	42	14					42		42				42			
11	51	14											51			1
12	16	14	16								16	16	16			
15	70	14					70		70				70			
16	55	14											55			
17	93	14									93	93	93			
18	78	14					78		78				78			
19	74	14											74		1	
20	24	14			24						24		24			
21	11	14					11		11.04				11			
24	54	14									54	54	54			
31	37	14											37			
33	34	14					34		34				34			
34	54	14					54		54				54			
37	25	14											25			
41	110	14											110			
Total	1594		16.289	0	24	0	289	0	288.7	0	705	682	1594	0	2	2

North Fork Saline Project

Compartment 1453 - North Fork Saline River Project																
Stand	Acres		Management Areas		Harvest Activities			Stand Improvement			Reforestation	Prescribe Burn	Wildlife			
					Clear Cut	Shelter Wood (Plant Seedling if necessary)	Seed Tree (Plant Seedlings if Necessary)	Removal	Commercial Thin	Precommercial Thin	Midstory	Release	SitePrep Manual (Chemical), Mech SP, Site Prep Prescribe Burning	Planting	Fuel Reduction Control Understory Species Wildlife	Midstory/ or Woodland
	Acres	Unit	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Each	Each
38	40	14					40		40				40			
40	58	14					58		58				58			
Total	99		0	0	0	0	99	0	99	0	0	0	99	0	0	0

Project Summary - North Fork Saline River Project																	
Compartment	Acres	Management Areas	Harvest Activities					Stand Improvement		Reforestation		Prescribe Burn	Wildlife				
			Clear Cut	Shelter Wood (Plant Seedling if necessary)	Seed Tree (Plant Seedlings if Necessary)	Removal	Commercial Thin	Precommercial Thin	Midstory	Release	SitePrep Manual (Chemical), Mech SP, Site Prep Prescribe Burning	Planting	Fuel Reduction Control Understory Species Wildlife	Midstory/or Woodland	Ponds/+2 Nest Boxes	Rare Upland Cmnty and/or Glades	Creation of Wildlife Opening
	Acres	Unit	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Each	Each	Each
1435	2124	0	123	26	29	0	431	0	431	0	177	123	2124	0+	13	7	0
1436	1908	0	0	97	43	0	423	0	292	124	215	76	1908	0	9	4	4
1437	2506	0	0	0	0	0	66	0	66	73	0	0	2506	498	5	2	3
1438	2665	0	0	0	174	0	291	0	291	430	174	0	2665	506	18	3	2
1450	1812	0	202	0	144	0	428	0	428	0	346	202	1812	119	0	2	0
1451	1994	0	66	0	46	0	321	0	68	502	112	66	1994	0	0	0	1
1452	1594	0	16	0	24	0	289	0	289	0	705	682	1594	0	2	0	2
1453	99	0	0	0	0	0	99	0	99	0	0	0	99	0	0	0	0
TOT	14700		407	123	459	0	2347	0	1963	1129	1730	1148	14700	1122	46	18	12

Appendix B: Project Maps

Revised Forest Plan Management Areas

Proposed Harvests

Proposed Stand Improvements

Proposed Wildlife Habitat Improvements

Proposed Burn Units

Proposed Project Area

Proposed Roads (also a large scale version)

Maps are not embedded into document due to file size constraints.

Maps are available at:

www.fs.usda.gov/project/?project=55319